# THE JOURNAL OF GAS LIGHTING
## WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXVI. No. 1954.] LONDON, OCTOBER 23, 1900. [52ND YEAR. PRICE 6d.



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SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

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Yield of Gas per Ton . 10,500 Cubic Feet.
Illuminating Power . . . 16·4 Candles.
Coke . . . . . 68 per Cent.

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BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES, TOOLS, &c., AND OF
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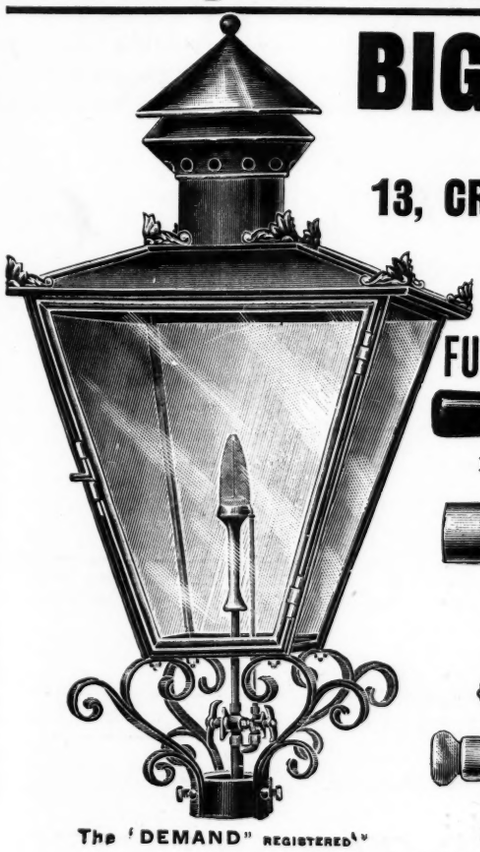
LONDON: LAMBETH BRASS & IRON CO., Ltd., Short St., LAMBETH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**13, CROSS STREET, FINSBURY PAVEMENT,**
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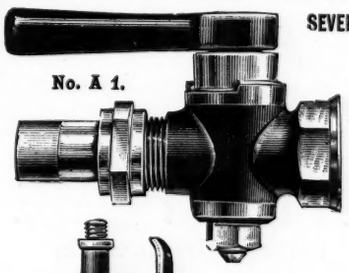
**FULL-WAY MAIN TAPS & LANTERN TAPS.**
SEVERAL DESIGNS SHOWN BELOW.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**FULL-WAY**
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No. A.

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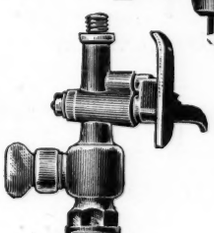
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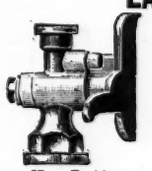
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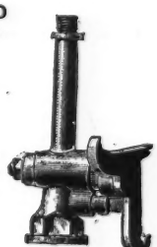
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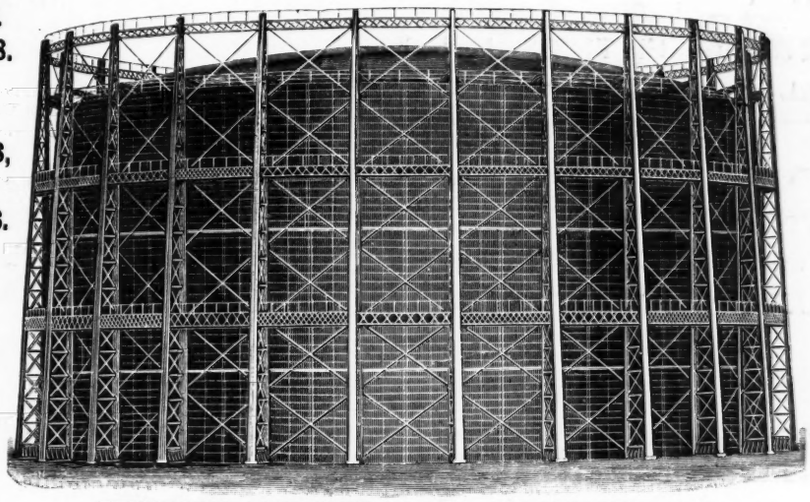

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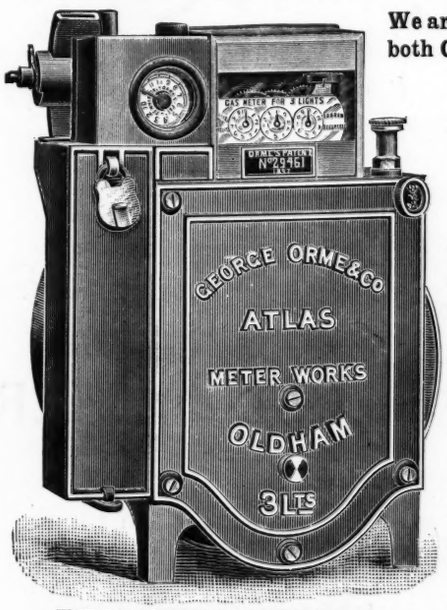


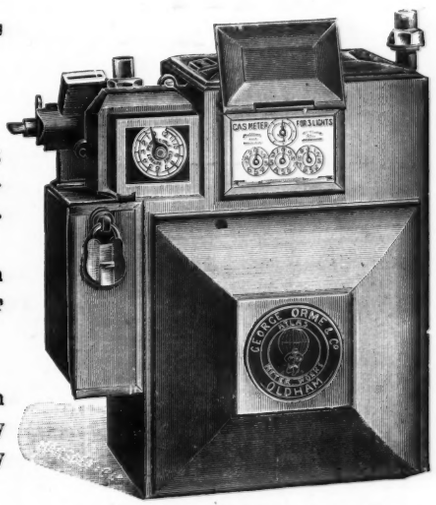

WET COIN METER IN CAST-IRON CASE.

A large number of these Meters are in use, and giving satisfaction.

The Mechanism is very simple; and there are no springs or complicated parts to get out of order.

We supply them to work with **1d., 1s., or any other Coin desired.**

The Selling Price of Gas can be changed *in Situ*, and any number of feet delivered, as may be required.



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Improved COAL and COKE HANDLING PLANT, CONVEYORS, and ELEVATORS,

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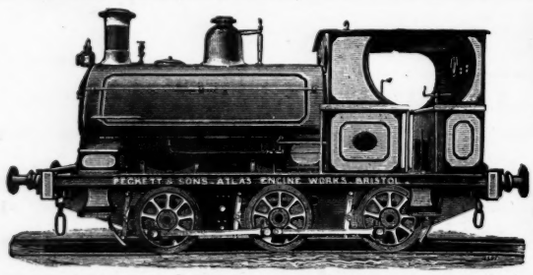


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LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c. Locomotives of various Sizes always in Stock, ready for Immediate Delivery.

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# ALDWARKE MAIN GAS COAL

Analysis: 12,600 Feet of 19-Candle Gas per Ton.

Value in Pounds of Sperm, 820·80.

VERY FREE FROM IMPURITIES.

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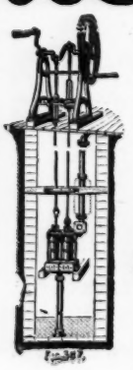

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THE

# DENAYROUZE LIGHT SYNDICATE, LTD.

28, VICTORIA STREET, WESTMINSTER, S.W.

*The Pioneers of Incandescent Burners without Chimneys.*

**THE "SMALL TORCH"** Burner (Bandsept Patent) for Street Lighting, consuming **3½** feet of Gas per Hour, having an efficiency of **25-Candle Power per Cubic Foot of Gas** consumed at ordinary pressure, is not only the **BEST** but **CHEAPEST** intensive **CHIMNEYLESS** Burner on the Market.

PRICE COMPLETE WITH MANTLE

**4s. 9d.**

All other Burners supplied by the Syndicate proportionately reduced, full Particulars of which will shortly be issued to the Trade, and followed by new and complete Catalogue.

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COAL AND COKE BREAKING, ELEVATING, AND CONVEYING MACHINERY.
ROOFS.
BENCH, FURNACE, AND FLOOR IRONWORK.

MOUTHPIECES, WITH SELF-SEALING OR LUTED LIDS.

RETORT-SETTINGS OF EVERY DESCRIPTION.

*INCLINED & HORIZONTAL, REGENERATOR, GENERATOR, & DIRECT FIRED.*

SHALLOW REGENERATORS A SPECIALITY.

SOLE MAKERS OF HUDSON & RANN'S PATENT AUTOMATIC CHIMNEY DRAUGHT REGULATOR.

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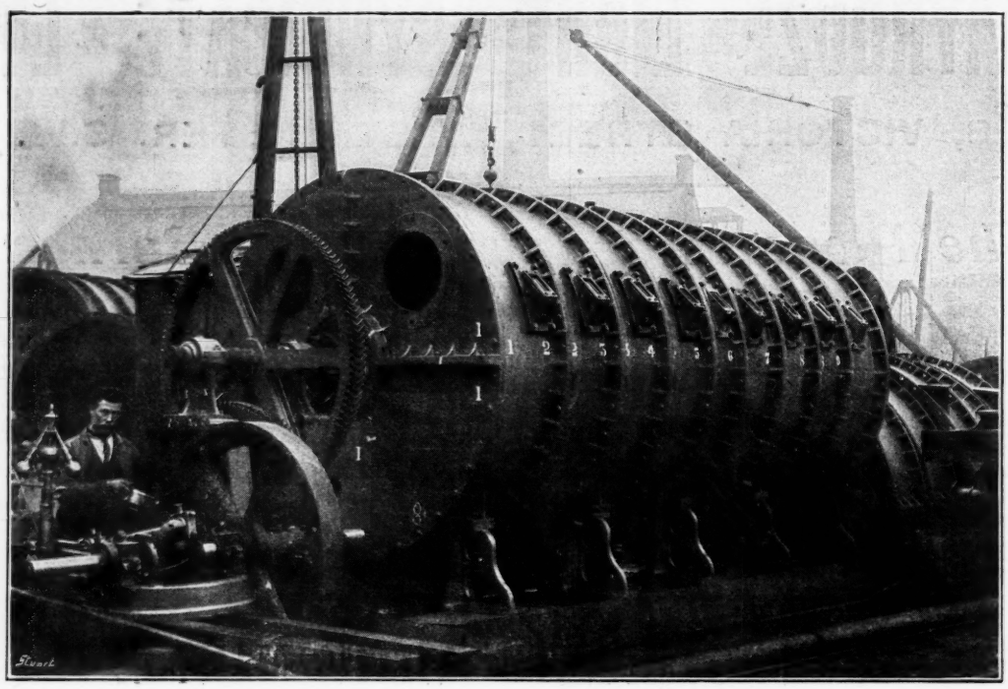
All Sizes from 50,000 to 5,000,000 Cubic Feet of Gas per Day.



The "NEW" Scrubber-Washer can be arranged to suit all cases of the Washing of Gases with Liquids.

**NOTE:**—Orders already received in **1900** for **MACHINES** to deal with **39,700,000** Cubic Feet of Gas per Diem.

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**CAST-IRON PIPES**

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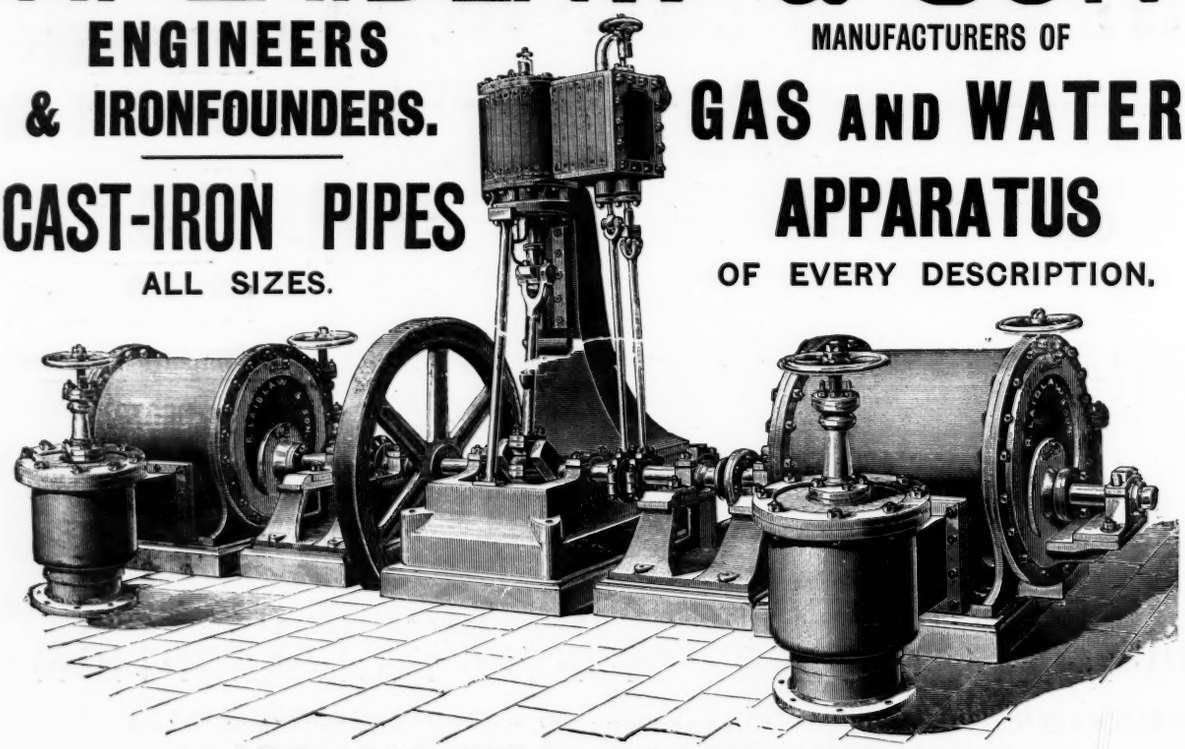

BEALE'S GAS EXHAUSTERS AND ENGINE COMBINED—ALL SIZES.

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THE EAGLE RANGE & GAS STOVE COMPANY, LTD.,

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"ACME" GAS STOVE WORKS,

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This superb Fire is acknowledged the best for Hiring Purposes.

*Inspection of our Goods invited at*

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Patent REGENERATIVE SETTINGS,

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DESIGNS AND ESTIMATES ON APPLICATION.

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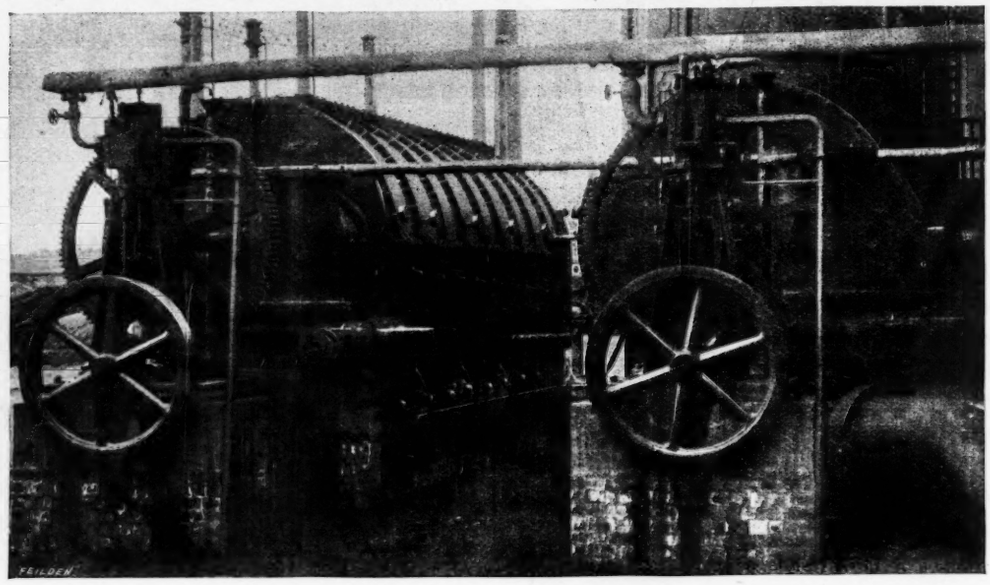
**Cubic Feet of Gas per day are now being Purified by**

# PATENT "STANDARD" WASHER-SCRUBBERS

**which extract ALL the Ammonia and a large proportion of the $CO_2$ and $H_2S$.**

Prevention of Slip of Gas Unwashed
Strength of Liquor Concentrated.



Maximum Washing Surface.
Easy access to interior.

PHOTO. OF MACHINES RECENTLY ERECTED AT THE SCULCOATES WORKS, HULL.

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Manufacture & supply best quality of

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Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.

FIRE BRICKS, LUMPS, & TILES, BLUE STAFFORDSHIRE VITRIFIED BRICKS FOR PAVING, &c. &c.

*EVERY REQUISITE FOR GAS-WORKS. Retort Setters sent to any part of the Kingdom.*

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# CARBURETTED WATER-GAS PLANT

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| | Cub. Ft. Daily. | | Cub. Ft. Daily. | | Cub. Ft. Daily |
|---|---|---|---|---|---|
| Copenhagen | 700,000 | Coventry | 600,000 | Lawrence, Mass. | 400,000 |
| Copenhagen (2nd) | 2,500,000 | Coventry (2nd) | 600,000 | Commercial Gas Co. | 850,000 |
| Belfast | 1,700,000 | Bordentown, N.J. | 125,000 | Commercial (2nd) | 850,000 |
| Belfast (2nd) | 4,500,000 | Winchester | 225,000 | Commercial (3rd) | 1,250,000 |
| Brussels | 750,000 | Shanghai | 225,000 | Rotterdam | 850,000 |
| Brussels (2nd) | 750,000 | Stockport | 600,000 | Dorking | 150,000 |
| Liverpool | 3,500,000 | Norwich | 1,000,000 | McKeesport, Pa. | 500,000 |
| Liverpool (2nd) | 4,500,000 | Holyoke, Mass. | 600,000 | G.L.&C.Co., Bromley | 3,750,000 |
| Tottenham | 750,000 | St. Joseph, Mo. | 750,000 | G.L.&C.Co., Nine Elms. | 2,750,000 |
| Tottenham (2nd) | 750,000 | Lea Bridge | 350,000 | Durham | 200,000 |
| Santiago de Cuba | 400,000 | Lea Bridge (2nd) | 350,000 | New York | 4,000,000 |
| Swansea | 750,000 | Stockton-on-Tees | 500,000 | Scarborough | 800,000 |
| Manchester | 3,500,000 | Edinburgh | 2,000,000 | Perth, W.A. | 125,000 |
| Brighton | 1,750,000 | Guildford | 350,000 | Bremen | 550,000 |
| Preston | 1,400,000 | Brentford | 1,200,000 | Maidenhead | 225,000 |
| New York | 1,200,000 | Syracuse, N.Y. | 850,000 | Epsom | 225,000 |
| Southport | 750,000 | Bridlington | 150,000 | North Middlesex | 150,000 |
| Bath | 1,000,000 | Middlesbrough | 1,250,000 | Wandsworth | 1,800,000 |
| Newburg, N.Y. | 350,000 | Croydon | 1,250,000 | Aarhus | 800,000 |
| Newburg (2nd) | 250,000 | L. & N.W. Ry., Crewe | 700,000 | Falmouth | 150,000 |
| Hoylake | 125,000 | Taunton | 225,000 | Southampton | 800,000 |

## SINCE JANUARY 1ST, 1899.

| | | | | | |
|---|---|---|---|---|---|
| Hartlepool | 750,000 | Stockport (2nd) | 600,000 | Faversham | 200,000 |
| Utrecht | 1,000,000 | Croydon (2nd) | 625,000 | Birmingham (Swan V'ge) | 1,500,000 |
| Deventer | 150,000 | Maidenhead (2nd) | 225,000 | St. Gallen (Switz.) | 225,000 |
| Portsmouth | 1,000,000 | G.L.&C.Co., Beckton | 2,250,000 | Colney Hatch | 400,000 |
| Bournemouth | 1,000,000 | G.L.&C.Co., Fulham | 1,750,000 | Southampton (2nd) | 500,000 |
| Aylesbury | 150,000 | Tottenham (3rd) | 350,000 | Tunbridge Wells | 1,000,000 |
| Hamburg | 1,750,000 | Sydney (Harbour) | 500,000 | Hebden Bridge | 200,000 |
| Redhill | 275,000 | Sydney (Mortlake) | 500,000 | Chorley | 300,000 |
| Dublin | 2,000,000 | Manchester (2nd) | 3,500,000 | Liège | 1,000,000 |
| Posen | 450,000 | Hull | 1,500,000 | Stafford | 500,000 |
| Dunedin (N.Z.) | 150,000 | Longton | 600,000 | Bridlington (2nd) | 200,000 |
| Lincoln | 500,000 | Staines | 600,000 | Gosport | 200,000 |
| Antwerp | 1,500,000 | Commercial (4th) | 2,000,000 | G.L.&C.C., Beckton (2nd) | 10,750,000 |
| Brussels | 1,000,000 | Dublin (2nd) | 2,000,000 | Tottenham (4th) | 1,000,000 |
| Brighton (2nd) | 1,850,000 | | | | |

[The 1891 Installations of The Gaslight and Coke Co., 12,000,000 Cubic Feet Daily.]

**Total Capacity above 128,950,000 Cubic Feet Daily.**

**United States Total 250,650,000 Cubic Feet Daily.**

**Grand Total - 379,600,000 Cubic Feet Daily.**

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Telegrams: "EPISTOLARY, LONDON."

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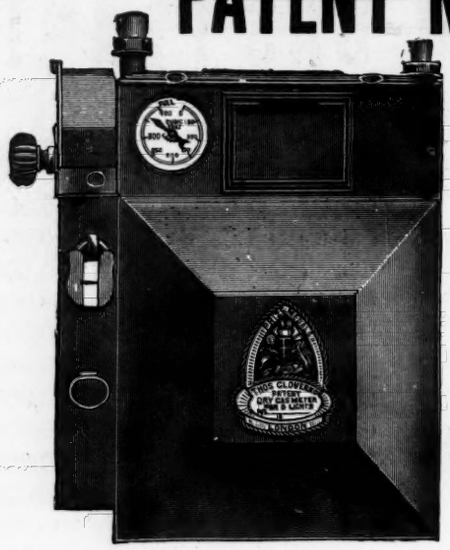
BANK OF COMMERCE BUILDING, NEW YORK.

# THOMAS GLOVER & CO.'S
# PATENT NEW IMPROVED
# PREPAYMENT METER



**For Pennies, Shillings, or any Coin.**

**Simple in Mechanism.**
**Positive in Results.**
**Price Changer *in Situ.***

**GUARANTEED FOR FIVE YEARS.**

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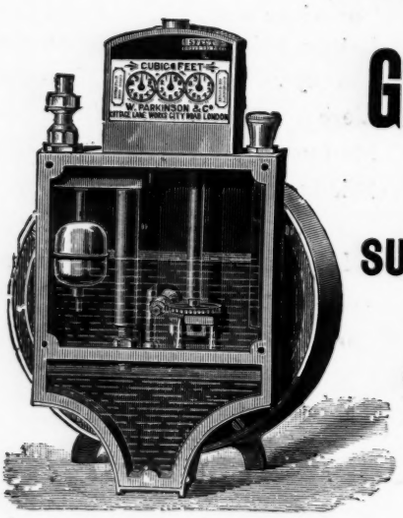

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## EDITORIAL NOTES.

### Local Authorities' Conference on the London Gas Question.

A FURTHER stage in the development of the London Gas Question was marked on Wednesday last by the holding of a conference, at the London County Council offices, of representatives of the multitudinous Metropolitan Local Authorities, under the presidency of Mr. E. A. Cornwall, the Chairman of the Parliamentary Committee of the County Council. The business before the meeting was to consider the prices of gas, and other matters connected with the general subject. The Chairman reviewed the history of the gas supply of London in an able speech; his point of view, of course, being that of an uncompromising censor of the existing state of things. He looked back fondly on the age of competition; speaking with unaffected regret of the period when "consumers were able to buy "from whichever Company they pleased at the lowest "price, and make the best bargain they could." He might have added, "and bad was the best," compared with the prices and conditions of the supply of gas to-day; but that would have introduced an element of impartiality into his discourse which would have spoilt its symmetry. Mr. Cornwall's main point was the failure of the actual settlement to satisfy the consumers. He gave an estimate—none too modest—of the amount of extra dividend which, as he politely put it, the Gas Companies have "pocketed" by reason of the sliding-scale arrangement; but he naturally omitted to state the corresponding amount of reduction of gas prices which rendered this process possible. Now, whatever opinions may be held as to the relation of these quantities being altogether or even largely one of cause and effect, it is distinctly unfair to mention one and absolutely ignore the other.

The unfairness of the Chairman in this respect brought its own swift retribution, in the shape of a muddled and wasted meeting. Mr. Cornwall really ought to have known better. He, at any rate, has no excuse for making believe that the gas question of London can be disposed of by any off-hand expedient based upon an *ex parte* statement. The London County Council have tried several "falls" with both the Gas and the Water Companies of London, in just this one-sided style; and they have always come off second best. They will continue to experience the same fate, so long as they persist in ignoring the facts and the real difficulties of the questions to which they address themselves. Mr. Cornwall talked about this and that parliamentary move of the Gas Companies as being "very "shrewd," or "very clever." This qualification does not agree with his accusations of stupidity—or mismanagement, which is the same thing—against the same subjects of his somewhat rancorous censure. The truth of this part of the matter is that the Companies always know what they want of Parliament, and occasionally get it. Their opponents are not so clear, and cannot be so long as they shut their eyes to entire aspects of the questions. Therefore it is their parliamentary campaigns are bootless.

Mr. Cornwall gave his case away when he declared that "the consumers had had no benefit whatever" from the sliding-scale; which, of course, includes the auction clauses, here completely ignored. What is the use of Mr. Cornwall or anybody else calling a meeting ostensibly to consider the complete question of the Metropolitan Gas Supply, and never once mentioning the premium capital of the Companies, which is the first thing staring a would-be reorganizer in the face? Granting, for the sake of the argument, that his indictment of the Gaslight and Coke Company is well founded, what is to be done without injuring the innocent? But Mr. Cornwall was hopelessly at sea respecting other matters—notably the asserted case for the portable photometer. He should not have said that London gas can only be tested "by giving many hours' notice to the "Gas Company, and at special points," because the statement is not true. This is merely a sample of the kind of falsehood and loose talk that gets its deserts in the Parliamentary Committee Rooms.

Mr. Trenner, a delegate from Holborn, had a point (such as it was) in regard to the possible redemption of the Gas Companies' obsolete capital by devoting to this purpose the extra sliding-scale dividend. After him, the delegates talked at large about many things without evolving any distinct policy. Mr. Wallace, of Camberwell, prudently reminded the conference that it was useless to pass resolutions calling for a revision of the sliding-scale of price and

dividend "unless they knew what they meant, and meant "what they said." The inevitable Sir Albert Rollit, that typical Town Clerk of his time, brought the conference to book, when the Chairman evidently wanted a lead, with the suggestion that they should base their deliberations upon the recommendations of the Powers of Charge Committee. Hereupon Mr. Trenner scored again, with a resolution to omit from Recommendation No. 1 the reference to waiting until the Companies went to Parliament of their own accord. His familiar query, "Why "should London wait?" carried this motion; but he had to give up for the time his point about applying extra sliding-scale dividends to redeem obsolete capital, possibly on account of the difficulty of defining what is obsolete and unproductive capital in every case.

The upshot of the whole business, however, was little enough. A resolution was passed declaring "that, in the "opinion of this conference, the time has arrived when the "sliding-scale, 1875-76, needs revision in the interests of "gas consumers." Several other resolutions of greater or less significance, which will be found duly set out in our report of the proceedings, were also passed, including one declaring "the practice of the Gaslight and Coke Com-"pany of treating the north and south differentially . . . "is a grievance which ought to be redressed." This conclusion seems very tame. The sinking-fund resolution was carried by itself after all; and Mr. Trenner has the satisfaction of knowing that the honours of the day were his. Several of the delegates seemed to have a better grasp of the subject than the Chairman. There is still a good deal to be hammered out at the Lord Mayor's conference on the same business, which has been fixed for the 31st inst. at the Guildhall. Meanwhile, those who purpose attending the meeting will be well advised to look into that matter of the premium capital of the Companies, so as not to have the second conference labouring under the disadvantages placed upon the first.

### Elections Past and Future.

THE General Election is over; and the country has given the Government the answer to the question put, as we remarked a month ago, in the form of a "short point." Also, as we then observed, a clean sweep has been made by the great mass of the electorate of the men of sectional issues and small side causes. The unanimity of the big, and what it is customary to regard as the more enlightened, constituencies has been most impressive. And, further, it is pleasant to be able to record, the wish we expressed for the return of "honest gentlemen" has been most conspicuously gratified. All the old and trusted servants of the public who wished to be back again at Westminster have had their desire; and many of those who had forfeited the confidence of the public have been sent about their business. The Government now stands before the world stronger than ever after its touch of the soil, with a free hand for anything after the more pressing work of the hour shall have been disposed of. The professional Labour Leaders, so styled, have had a bad time of it. Political capital was sought to be made out of Mr. Chamberlain's blunt declaration that men of this stamp are of little or no use in Parliament. But the electors were of his mind in most places where their opinion was asked upon the point. True, the disappointed Labour candidates for parliamentary honours had their perverse opinions on the great question of the election to thank for their rejection, even more than their classification; but it is a matter for congratulation that so many working-class constituencies saw the fallacy of the pretension upon which this class candidature is based.

It really looks as if the new Parliament will turn out to be of even better composition than the old one. As usual, the Bar supplies more members than any other profession. On the theory of class representation, or delegation, of course this would be a defect. About one in six of the new House of Commons has been called to the Bar; but that does not mean that this large proportion of members are lawyers in anything more than the description. It speaks well for the character and all-round ability of the followers of the legal profession that they should command the suffrages of so many diverse constituencies, town and country. There ought, one would think, to be very little bad law perpetrated by a Parliament so leavened by lawyers; and yet one is reminded of the old saw about the bad shoeing of blacksmiths' horses and cobblers' wives. Statute law is a safe "draw" for judicial scorn; yet most Judges have sat in Parliament and had a hand in the manufacture of laws. Next in number to the legal contingent come the gentry and landowners, pressed closely by manufacturers, merchants, newspaper proprietors and journalists, the liquor trades, bankers, and so forth, down to the "estate agents, architects, and accountants," who form a class of two! Still, what matters the classification, so long as the members are personally "good men and "true"?

No sooner have the echoes of the Parliamentary General Election died away, than preparation has to be made for that minor general election in London which is to give the Metropolis its new local authorities. Among the nondescript rejected of the London parliamentary boroughs were numbered the most notorious of the London County Council politicians. How the men of the same "stripe" will fare next month, remains to be seen. Already the newspaper organs of Progressivism are getting ready the haloes for their favourite candidates; for it is a curious twist of municipal politicians of this brand to claim a monopoly of all the civic virtues. We noticed last week that one of these newspapers unctuously adjured the London municipal electorate to return borough members who would strive to make municipal employment the pattern as regards pay and privileges for all employers of labour to follow, at whatever distance. It is to be hoped that the issue of this pandering to the working-class voter will be taken fairly and squarely at the coming election. It is high time that the ratepayers reminded the London County Council and the other Metropolitan authorities that the world does not exist for the coddling of their working-men pets. There are some other interests to be considered than those of the Trade Union bricklayers, plasterers, carpenters, and paviors, who seem to think that the earth and the fulness thereof belong to them, and that county councils and local boards of every kind have nothing better to do than to see that they get it.

Naturally, the conduct of the County Council in this regard is copied by the other authorities. Here is Poplar, for instance, building its electric lighting station at first hand, employing labour directly. What did Mr. H. E. Jones have to say the other day about the extravagant and unnecessary paving work done at the East-end, apparently with the chief object of finding employment for an army of workpeople? A nice object-lesson in vestry morality, too, is the sealing, at the eleventh hour, by the Vestry of St. George's, Hanover Square, of an electric street lighting contract to run for thirty-one years. Then there is the case of Hackney, where Vestry electric lighting and other extravagant enterprises have run the rates up from £63,757 to £193,495 in the last five years. Mr. Dickinson, the Chairman of the London County Council, has just started the Hackney electricity works, which is one of the "dust-"cart and dynamo" delusions, and cost £250,000. In his speech on this occasion, he urged his audience, "as "soon as the new light was ready, to cut off their gas!" Two can play at that game.

Whether for good or for evil, in these first London borough elections few new men are coming forward. The old vestrymen are competing against one another for the reduced number of seats. Obviously, in these circumstances, there is no guarantee that the fittest will generally survive. The heavily-subsidized vestry labourers will look after their friends. But still, unless every gleam of common sense has departed from the Metropolitan ratepayer, he will take the trouble to vote for the candidates who do not engage to make an earthly paradise for labourers at his expense. It is all very well to bang the big drum of Progress at the head of a procession of Trade Unionists anxious above all things for "soft jobs;" but it must by this time be perceived by those who look on that the term is a misnomer. After all, true Progress is a plant of very small growth in this weary world. Not very much can be done directly in this cause by a municipal corporation. To keep the town clean would be Progress enough for one generation of London municipalizers. There is not much glory to be won in this way; but a clean street is more credit to a Corporation than a cooked balance-sheet. To be always clamouring and arranging for some new thing seems to be some people's ideal of municipal efficiency; we would rather see it in the removal of some old eyesore, the stopping of some chronic leak of public money. If the public can only find out the men who will be contented to do this drudgery in their interest, and

do it thoroughly, these are they who should be selected for the new borough councils; but we are not oversanguine on the subject. Such faithful servants of the body politic do not, as a rule, advertise. They are not picturesque figures. The popular newspapers cannot make anything out of them. They do not tickle the popular fancy; and therefore they are passed over. The efficiency of all governments, in the last place, is the accident of their composition. If there happens to be a good man or two in the body, its business will be well done; otherwise not. The democratic or aristocratic form of the government is of no significance; but only the former is possible for this country, now and henceforward. If the democratic form is inspired by the ablest and best spirit of the Age—if, that is to say, its character is truly aristocratic—then the result of its operation cannot be otherwise than happy, useful, and economical.

**An Apologist for the Coalowners.**

THE address read to the annual meeting of the South Staffordshire and East Worcestershire Institute of Mining Engineers yesterday week by the President, Mr. F. G. Meachem, who is the Manager of the Hamstead Colliery, has attracted some attention, as being in the nature of a defence of the coalowners' action in forcing up the price of coal to its present level. We do not think that the owners have any reason to feel grateful to Mr. Meachem for his efforts on their behalf, as his outline of the policy that has been and is to be pursued by them is as unsatisfactory from the standpoint of the consumer—which is to say from a national point of view—as could well be imagined, while many of his arguments are nothing but specious fallacies. The policy which, according to Mr. Meachem, has been partially adopted in the past, and which he urges should be fully adopted in the future, by the colliery proprietors, is, "co-operation, not competition." The coalowners have been a down-trodden, self-sacrificing, philanthropic body of men in the past—content to take a miserable profit, or even to work at heavy loss, if they might only be allowed to contribute to their country's prosperity. But, failing of the national appreciation which their unselfish conduct should have won, they have at length been driven by the apparition of starvation to take measures to protect themselves. So, in future, coal is only to be sold "at a remunerative rate;" and the coalowners are to settle the definition of "remunerative" for themselves. "A selling-price basis," says this representative of the collieries, "fixed as a minimum, which shall be a remunerative one, "seems to me as necessary as having a living-wage basis "among the operatives." Times have changed, indeed, when a colliery manager is found talking about the miner's "living wage" (which no man has ever yet succeeded in defining) as being "necessary;" and what a counting of chickens before they are hatched for the manager to make all his calculations of future profits without allowing for the action of that most inconvenient factor the "law of "supply and demand"!

And what about our position in the commercial markets of the world? Oh, says this great economist, that is easily arranged. Let the combined trades, coal and iron, form a Board of Representation, "whose task should be the collecting of information in reference to selling prices of foreign-made iron on the English market;" and then the Board could "so arrange the price of coal as to allow of the making of iron at such a price as would enable English "makers to compete in every market." This, says the "Colliery Guardian," is "a most valuable suggestion," which may prove to be the germ of the solution of the problem contained in the possibility of an era of permanently dear coal. We have no hesitation in describing it as a suggestion which is only saved from being mischievous by its own obvious absurdity. As if, forsooth, the ironmaster and the coalmaster would ever agree as to what price the first should pay the second, even supposing they could jointly obtain sole command over that price! But the most astonishing thing about this precious suggestion is that its author coolly ignores the requirements of any other buyers of coal beside the ironmasters, or the effect of high prices upon any other industry in the country. "The "household consumer," he has the effrontery to declare, "certainly could not expect the same consideration as the "manufacturer"—why, he does not condescend to explain—"and the observance of a little more economy on their "part would certainly minimize the effect of high-priced "fuel." It would, we may remark, also minimize the coal owners' business. But what about the railway companies, the gas companies, and other not altogether insignificant consumers of coal—are they entitled to no "consideration"? Unless the colliery proprietors really wish that insult should be added to the injury that the present price of coal is inflicting upon almost every trade in the country, they had better silence Mr. Meachem.

Increased demand, says Mr. Meachem, should be placed first among the causes of the rise in the price of coal. That, we suppose, is why he suggests increased economy to coal consumers as a method of compensating for the high price he is so anxious to maintain. The logic is as good as when he first says that a tax on coal exports would not reduce the demand from abroad, "for, if coal is a "necessity to the foreign purchaser, an import duty would "but force a higher price, and not restrict his purchasing," and then remarks later that "a tax would do no good "whatever, and would open our markets to foreign col-"lieries." We are asked to accept as conclusive evidence that the coalowners are not reaping tremendous profits at present—Mr. Meachem having previously explained that it is only by means of such "grand years for collieries" as this that the bad years are rendered endurable—the facts that colliery assessments have materially increased (a proof, evidently, that the valuers do not think the owners are doing very badly), that the Workmen's Compensation Act imposes an extra cost of 2d. per ton (this has been stated by other authorities to be less than 1d. per ton), that stores have gone up in price, and that wages have been considerably increased. Seeing that wages have only risen because of the higher price of coal, and that all the other reasons put together only account for a few pence per ton, while the charge for capital remains practically constant, we must really be forgiven if we remain unconvinced. And how are the balance-sheets of the coal-mining companies to be explained? And what did Mr. Meachem mean when he said that "the present "price of coal affords us, as an institute, matter for con-"gratulation in which the coal trade at large may certainly "share"?

**Mr. C. H. Wilson on the Allocation of Municipal Trading Profits.**

IT appears impossible to get away for a week from the controversy over municipal trading at a profit. In the last issue of the "JOURNAL" we reported in abstract the paper on the subject read by Mr. C. H. Wilson, a member of the Leeds Corporation, to the Incorporated Society of Accountants and Auditors, meeting in that city, with some notes of the discussion. We yield to nobody in respect for the profession which Mr. Wilson adorns, and only wish its members had more to do with the auditing of local authorities' accounts. If this were the case, possibly the modern fashion of municipal trading would in many quarters lose some of its attractiveness. It is not the smallest of the benefits that the new order in the local government of London will confer upon the ratepayers, that at last the borough accounts will be properly audited, which has not been usual with the Vestries. But, with all our esteem for accountants, when they are also honest men, we do not take them for more reliable guides on questions of policy than other capable citizens. Mr. Wilson, therefore, spoke as a townsman of Leeds when he advocated the general and systematic subsidizing of rates out of the disposable profits of municipal undertakings. We cannot see that he added materially to the well-known case on this side; while several speakers subsequently exposed some of its weaknesses. It seems particularly ungracious on the part of a Leeds man to advocate the surcharging of gas consumers to relieve the rates; seeing that it was by following the contrary policy that the great expansion and prosperity of the Leeds gas undertaking was ensured in the most critical period of its fortunes. He would be a bold man who should say that the Leeds gas property has improved and been a greater credit to municipal administration since that policy went out of favour at the Town Hall. Speaking as an accountant, Mr. Wilson was quite within his province in drawing attention to the hardship inflicted on ratepayers by the cast-iron rule of making all Corporation capital redeemable. If it could only be properly discriminated, that portion of a Corporation's estate which has a perpetual value, such as land, might safely be excepted from the operation of a sinking fund. This question is increasing in importance with the imminence of large schemes of housing improvement. Mr. Wilson utters a rather uncertain note, however, on the

doubtful subject of the equivalence of loan redemption and works' depreciation. This is a very important matter; and it is to be regretted that he rather belittled it in his anxiety to make the best showing for municipal trading at a profit.

### The Need of Using Young Men.

SPEAKING the other day at Halifax, upon the education scheme of the town's Chamber of Commerce, Mr. Carnegie called attention to the wisdom of making use of young men before they get their originality and enterprise rubbed out of them by routine's daily grind. Referring to the need of giving young men a sound commercial, technical, and general education—a need which the Halifax Chamber of Commerce are endeavouring to supply, so far as their sphere is concerned—Mr. Carnegie remarked that, while this was an essential to the commercial success of the nation, something further was needed. Not only must the young man be educated; he must be used. Employers had their part to perform. The young man of exceptional ability "must be called up and made a partner"—that is to say, must be given a position of importance in the concern, in which he can use his abilities to the best advantage. The great secret of success in America is, said Mr. Carnegie (and who more qualified to speak on the subject?), that employers there are always on the look-out for, and make the best use of, clever young fellows. Is that not a lesson which many employers in this country—and we would say especially Boards of Directors who do not depend for their livelihood on their Company doing something more than just earn the normal dividend—need to have brought home to them? Full well we know that in many a Gas Company the major portion of the able man's life is wasted in doing work far beneath his capacity, while he is waiting for another man's shoes, so that, when the vacancy does occur, he who twenty years before would have been eminently suited to fill it, has had his energies diminished by years of monotonous drudgery, his initiative and ability have decayed or perished for lack of exercise, and—he is given the post! In one case out of three perhaps (though probably not so frequently) is the "senior" man the best to succeed when the head man goes. In the majority of cases, the younger, keener, fresher man is he who will give the best return for the salary. It will be said, maybe, that the younger man will lack the experience of the older. Well, in some cases, this might be a weighty argument. We are not arguing that a young man is necessarily, only that he is very often, the best fitted for responsibility and power. But does not the accumulated experience frequently act upon the man in the same way as barnacles act upon a ship—making him slow rather than swift in action? The man who has run in a groove for a quarter of a century, who has got to think that what has been is the best and ever shall be, how is he to rub up the rusty machine when he cannot see the rust, to strike out new lines when the old are so much the easier for him to run upon? The chances are he will choose the line of least resistance, and adopt as his motto: "Anything for a peaceful life." Yes; Mr. Carnegie is right; for an employer to be most successful, he must look out for the clever young fellows, and use them.

We learn from the Hon. Secretary of the Midland Association of Gas Managers (Mr. Charles Meiklejohn, of Rugby) that the date of the autumn general meeting in Birmingham, announced as the 1st prox., has been changed to Thursday, the 8th.

Mr. Henry O'Connor, of Edinburgh, has been awarded a diploma of merit by the Edinburgh Association of Science and Art, for a paper on "The Gas We Burn," which he read before the Association in November last year, and noticed in the "JOURNAL" at the time.

According to the "Wealth and Progress of New South Wales, 1898-9," by Mr. T. A. Coghlan, the Statistician to the Colony, the largest output of coal—4,597,028 tons—was recorded for last year; but the fuel has so fallen in price that this considerable quantity was sold at about the same figure as three-fifths of the output in 1884. The average price at the pit mouth was 5s. 9d. per ton last year, as compared with 9s. 4d. per ton in 1885.

Mr. Edward A. Harman, M.Inst.C.E., Gas Engineer to the Huddersfield Corporation, was duly elected a member of the Sanitary Institute at the last meeting of the Council. Mr. Harman has done a considerable amount of work in connection with the disposal of sewage, and has made several interesting experiments with the sludge; obtaining therefrom illuminating gas to the amount of about 6000 cubic feet of 13-candle power per ton of material used (containing 28 per cent. of moisture). Particulars of the experiments appeared about two years ago.

## ESSAYS, COMMENTARIES, AND REVIEWS.

### GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1037.)

THE abundant supply of floating capital by reason of the large Government disbursements, and a strong demand for gold for the United States and the Continent, have caused some uncertainty as to the future course of the Money Market. The Stock Markets have naturally felt the effect of this; but, in addition, the aspect of affairs in China, and the prolongation of the guerilla warfare in South Africa, are checking business. With the continued absence of public buying orders, dealers have found it difficult to maintain the value of speculative securities in most departments; and prices at times during the past week have shown a drooping tendency. Investment stocks, however, have been firm owing to the ease in money rates; and Consols, Indian Government stocks, and some of the Colonial issues mark an advance. In the Gas Market, as in other gilt-edged securities, there has been a firm tone, though the dealings have been on a small scale throughout; and very few changes have taken place. In Gaslight issues, the ordinary was again moderately dealt in between 99½ and 100½; while in the secured issues, the 3 per cent. debentures were in request, and rose 1. The other Metropolitan Companies remain very quiet, with an occasional official record of business. In the Suburban and Provincial Gas group, the only feature is a rise of ½ in Alliance and Dublin 10 per cents; but a little business has been done in Brentford old and new stocks, and also in Brighton "A." The Continental group was again very quiet; the dividend announcement at the rate of 5 per cent. for the half year by the Imperial Continental having had no effect upon the market—business being done at 210 and 210½. Oriental showed weakness. There was a little dealing in San Paulo and Monte Video. As regards Water Companies, the chief feature was the demand for Southwark and Vauxhall ordinary, which has advanced 3, and the "A" debentures 1. There was also some inquiry for New River shares, which are quoted at an advance of 2.

The daily operations were: The week opened with renewed quietness in Gas and Water stocks; and prices were well maintained. A few bargains were recorded in Gaslight ordinary, Imperial Continental, and Monte Video. There was a little more activity on Tuesday; but prices were unaltered. Wednesday, however, saw a rise of 1 in Gaslight 3 per cent. debentures, and ½ in Alliance and Dublin 10 per cents. Southwark and Vauxhall "A" debentures gained 1. Thursday was also an inactive day; and prices remained unaltered in Gas and Water stocks. Gaslight ordinary changed hands at 100, Imperial Continental at 210, Brighton "A" at 152½, and Brentford new at 181½. Friday and Saturday, particularly the latter, were very quiet; but on Saturday Vauxhall ordinary further improved 1.

### ELECTRIC LIGHTING MEMORANDA.

**A Peculiar Transaction by the Vestry of St. George's, Hanover Square—Is it a "Job"?—The Competing Offers—Extravagance Wins.**

THE elections of the new Metropolitan Boroughs will be held on Nov. 1; and most of the moribund London Vestries and Boards of Works have already held their last meetings. With great consideration for their successors, several of these disappearing bodies have made arrangements in advance for carrying out the most important and expensive local public works. We noticed last week how the ratepayers of Poplar have been committed to an extravagant electric lighting "enterprise" of which the old authority have appropriated the glory, leaving the new borough to pay the bill. Electric lighting is almost the only trading affair in which London local authorities can indulge, happily for the ratepayers. The ingenuity of the old Vestries has been equal to committing the ratepayers to costly engagements on this account, even where there has been no attempt to set up parochial electricity supply. But the most glaring example in point that has come under notice is the action of the St. George's, Hanover Square, Vestry. This is how the matter stands in the bald record published in the current number of the "Electrician": "A special meeting of the Vestry was held last week to receive a report from the Electric Lighting Committee in regard to the electric lighting of the streets. At the outset, a communication was read from the Gaslight and Coke Company asking the Vestry to postpone their final decision, as the Company had under consideration a more comprehensive scheme for the better lighting of the parish, at much less cost than the scheme for electric lighting. Notwithstanding this, the Committee recommended that the agreement with the Westminster Electric Supply Corporation be approved and adopted, and that the seal of the Vestry be affixed." An amendment to refer the matter to the new Municipality was defeated; and the Vestry sealed the fate of the ratepayers for thirty-one years after their own demise.

On the face of it, a more scandalous "job" was never rushed through a Metropolitan local authority. What the reason was for this indecent haste, did not transpire. One vestryman said that the question of the parish lighting had been before the Vestry for fourteen years. We suppose it has occupied the attention of this august body for a very much longer period than that—ever since public street lighting was introduced, in fact.

But why this consideration should have been allowed to prevent the matter being deferred for another year, or at least left over for the new Municipality to decide, is a mystery of Bumbledom. We do not, of course, accuse the Westminster Electric Lighting Company of malpractices in this connection; for, as a business firm, they naturally snapped at a fat contract while they had the chance of getting it. What the Vestrymen could have been thinking of to do a thing that lays them open to such injurious reflections, passes the wit of ordinary mortals to conceive. Where was the cause for hurry? We know what was the nature of the offer the Gas Company had to submit. It was alluded to in our first "Editorial Note" last week. The officers of the Distribution Department of the Company, being cognizant of what was going on between the Vestry and the Westminster Electricity Supply Corporation, considered, as men of business, what alternative proposal they could make to the Local Authority. High-power incandescent gas-lamps suggested themselves; but all gas technicians know quite well that this system of lighting has hitherto been in the experimental stage, and has only been applied to isolated groups of lamps. No gas company has yet organized a high-pressure gas-service for the public lighting of a large town district involving 600 lamps. Even the Westminster electricians, with nothing to learn in this respect, have two years in which to erect this number of lamps in St. George's, Hanover Square.

Naturally, therefore, the Gaslight and Coke Company had to decide whether they would be justified in making the fresh departure proposed by their officers, and incurring the new and additional responsibility of supplying high-pressure gas under the same conditions as those governing the usual run of street lighting work. Estimates had to be made and passed; but the outcome was the conclusion of which we gave the general points last week—that the improved lighting could be done for any Metropolitan parish, in 1000-candle power units, for a working expense of £16 5s. per annum, with £4 15s. a year extra for the first five years to wipe out the cost of the installation, which would thereafter be the property of the parish. The St. George's Vestry would not wait a week to allow the Gas Company's Board to adopt and submit a firm offer in these, or similar, terms. Instead, they rushed into a thirty-one years' contract to pay at the rate of £32 per annum for every 750 watt arc, £22 for every 500 watt arc, £4 per annum per 120 watt incandescent lamp, and £3 for every 60 watt lamp. And they are not to have the lamp-posts, or anything! The pill was slightly sugared by the addition of some petty, and utterly futile, allowances. Thus, there is to be "a cumulative rebate of ½ per cent. per annum for each year after the first full year during which any lamp has been used. This is a curious provision. In addition, in the tenth and twentieth year of the contract the Vestry are to be entitled "to refer to an arbitrator the question whether the charge should be varied in consequence of the adoption by the Company of any improvement or method which had resulted in a substantial alteration in the cost of public electric lighting." Why, this is after the stale old model of the Paris Gas Treaty, with its provision for price revision by a Technical Commission; which never yet ordered a half-penny reduction. It reproduces the worst features of the Continental "concession," which has hitherto been unheard-of in this country. Whatever the defects of our English system of regulating such matters, it does recognize the economic truth that the price at which the vendor can afford to sell an article depends chiefly upon the prosperity of his business, not upon its technique. At St. George's, they have elected to bind the ratepayers for a generation to pay through the nose for electric street lighting, under a set of cast-iron rules which absolutely debar the public from all hope of getting anything better or cheaper during the whole of this outrageous period. It may be doubted whether a Vestry has the legal right to enter into such a contract, for such a time; but there can be no doubt whatever of the moral character of the arrangement. Arc lamps at £32 a year ought to be good business for the Company, whose Manager deserves a compliment on his address in pulling off such a deal in the nick of time. But if the Local Government Board have no power to interfere, in the peculiar circumstances, there must be a screw loose in the London Local Government Act, 1899.

## AFTER ELEVEN YEARS OF PROFIT-SHARING.

THE valuable Paris Gas Conference paper of M. Hedde, of Paris,* on methods of interesting gas workers in their employment, forms an excellent supplement to our appreciation of Dr. Gilman's useful work.† M. Hedde is particularly worth reading by English gas managers, for the sake of the un-English standpoint naturally taken by him in regard to the different divisions of his subject. It almost strikes one as an oddity, nowadays, to find "fixed wages" put in the first place among means for interesting workpeople in their work. The Trade Unions and their Socialist instructors have so effectually divorced the idea of earning wages from that of the obligation to do honest and dutiful work, that it comes with quite a shock to be reminded that it used to be regarded as one of the chief duties of man to be a "profitable servant," in his place and degree. Let us take the liberty of pausing for a moment on this old aspect of work, in order to impress it upon those who may be tempted to rely over-much on any premium-device for evoking faithful service, that no such expedient can be anything more than an encouragement, an accessory, or a recognition of the operation of a deeper, stronger motive. No system of profit-sharing or other means of encouraging good workers can make bad workers into good ones. If the spring of honesty and dutifulness to his salt is not in a man, these expedients will not plant it in him. If the very soul of the workman is saturated with Collectivist sentiment, nothing that can be done for him—no amount of wages, even—will reconcile him to his position in the industrial system, to say nothing of interesting him in his work. Therefore, the history of all successful profit-sharing or other premium schemes for the encouragement of workpeople, is in the first place a history of the weeding-out, and the consistent exclusion from employment, of all those whose hearts are not, and cannot be, in their work. This is a point which is far from being generally understood. We are not sure that even Mr. George Livesey has fully grasped the meaning of that animosity to his scheme of profit-sharing which has dogged its progress from its inception, and that lesser, but still mortifying, indifference to it which persists among some even in the South Metropolitan preserve.

When an employer has got hold of a man whose heart is in his work, how shall he be encouraged to put forth the best that is in him? Practically, nobody in authority in the industrial world acts on the assumption that the payment of wages is all the encouragement, as well as all the recompense, that faithful work deserves. Obviously, wages are, and must always be, the chief consideration for the reward of labour, if only by reason of the preponderating amount of this payment. But there is always something more, regular or apparently accidental. Although the whole strength of Trade Unionism is arrayed against the operation of natural selection in the labour market, yet the principle cannot be wholly suppressed, even in the most society-ridden trades. Every promotion, every advance of pay or position, is in one sense an act of encouragement of the recipient and of all others who can hope for a similar experience. So that it cannot truly be said that present wages are everything to a workman. It has come to pass, through the course of time, that some employers, like Mr. Livesey, have persuaded themselves that what is called profit-sharing is upon the whole the best known means of systematizing this adventitious encouragement of faithful work. We have recently been favoured with a statement of Mr. Livesey's opinions upon this matter, after eleven years' experience of his application of it in the case of the South Metropolitan staff; and we are glad to be able to place the sense of this ripened judgment on record, after having published Dr. Gilman's and M. Hedde's views.

Theoretically, as everybody concedes, profit-sharing is unexceptionable. The difficulty arises when the most perfect ideal system has to be adapted to imperfect human nature and non-ideal industrial systems. The principle of profit-sharing has failed to bear the stress of this adaptation, in many instances; but Mr. Livesey declares that, being convinced of the soundness of the policy that all those who are engaged in a business undertaking should have a direct and personal interest in its prosperity, he is now able to testify that his experience of the working-out of the policy has been more gratifying than he ever expected or even hoped. That is much to say. But, of course, the success is not unqualified. There is a minority of South Metropolitan men with whom the experiment has proved a failure financially, and perhaps morally. These men bear no animosity to the principle; but they simply take their bonuses in cash as soon as they can, and spend them—too often, to their own loss and detriment. Indeed, they cannot help having a certain friendly feeling towards employers who provide them with this "unearned increment," entirely as an act of good will; and perhaps this feeling tends to make them more satisfactory servants than they might otherwise be. Hence, even in the case of these unthrifty ones, who treat their bonuses as so much deferred wages, the system is not all a failure.

Naturally, Mr. Livesey would prefer the whole of the South Metropolitan profit-sharers to be thrifty. He rightly regards as the best citizens those who save their cash bonus, and take the fullest advantage of the facilities offered by the Company for the investment of these savings. A staff having this co-partnery with the Company must be a tower of strength to the undertaking, a credit to the system, and a help to themselves. It is very surprising that from the commencement of the scheme, with what was very largely a new staff of workmen, to whom it was necessary to pay the first bonus in cash, in order that they should realize its possession, from 40 to 45 per cent. of the men did save the money. After five years' experience, it was deemed expedient to make only one-half of the bonus payable in cash; the balance being required to be left with the Company at interest. This resulted in nearly 40 per cent. of the cash portions being saved, thus making the grand total of 70 per cent. of the bonus invested, and only 30 per cent. withdrawn. The attention of the Profit-Sharing Committee was concentrated upon this withdrawn proportion, with fair success. In 1898 it was brought down to 27 per cent., in 1899 it was further reduced to 22 per cent.; and this year it has come down to 16 per cent. Out of the year's bonus of some £24,000, less than £4000 has been withdrawn. This is regarded as very good, but still not quite satisfactory; because there is reason to believe that the amount spent brought very little good to many, and much harm to some. The strength of the whole position lies in the share-holding, especially at the present juncture, when, owing to the

* See *ante*, pp. 839, 897.

† See *ante*, pp. 406, 691, 756, 827.

advanced price of gas, the bonus under the scheme is stopped for the time being. Although the premium does not come in, the men say that "they still have their dividends on the stock;" and so they rest content.

Of course, Mr. Livesey realizes, and allows for, the fact that the thrift aspect, or development of the scheme, is not the whole of it. It is understood that the Profit-Sharing Committee take a lenient view of all those cases of withdrawals of the bonus for which reasonable cause can be shown. There must always be instances where a better or more pressing use for a sum of money exists than the Company can afford. Therefore there will never be unanimity of practice in this regard. A strong point is made of the fact that the men are the absolute owners of their bonuses; and they can do what they please with them. Nevertheless, in such a fellowship as the staffs of the South Metropolitan and Crystal Palace District Companies now are, men chronically impecunious and shiftless are not well regarded by their fellows. It is not as if the sharing of profits were expected to be a substitute for the ordinary play of economic influences which in the long run fix rates of wages. Men are paid their current value in the labour market, just as though no profit-sharing existed. It will be remembered that recently gas workers' wages rose in sympathy with the advance of wages in the brickmaking and other occupations affected by season stokers. The point is that in a working companionship where the majority are solvent, thrifty citizens, enjoying the self-respect arising from possession of "a stake in the country," shiftlessness comes to be reprobated as it is in other social orders.

The longer-headed among the workpeople do not see why the skulkers should go on sharing profits they never attempt to earn. Consequently, it is their fellow-workmen in these circumstances—not only the employers—who find out the "Wait-a-bits," and make things unpleasant for them. And see how beneficently the natural process of separation operates in this connection—among the shiftless and the skulking are found all the Socialists, the disaffected, the shop-lawyers, and the agitators, or those who would be agitators in favourable circumstances. Under the ordinary conditions, it is these men who lead the rest against their employers. No sort of kindly or considerate treatment, nor any amount of money paid away in wages, will save workpeople from falling helplessly under the influence of agitators of their own class. Every little bit of friction, such as must inevitably occur in the internal economy of a great industrial establishment, gives these agitators their opportunity; and it is mere adroitness in making use of these occasions, and the "gift of the gab," which has sent most of the self-made "Labour Leaders" into comfortable berths and public notoriety at the expense of their dupes.

But under Mr. Livesey's system, the tables are turned. The talkers and the skulkers are utterly powerless to influence a two-thirds majority with stock certificates showing which side their bread is buttered. Out-at-elbows Socialism, smelling vilely of beer, dare not challenge well-to-do citizens' allegiance to their own, even if this happens to coincide with their employers', interest. The Workman-Director is the true working man's representative, not the scheming individual from outside who clamours in and out of season for a "recognition" which he does not get, for the reason revealed in the following story: Says one Irishman to another: "Pat, I saw ye walking down the street yesterday in grand company; but ye did not recognize me. I suppose ye did not know me." "Faith," was the reply, "it was just because I did know ye that I didn't acknowledge ye."

Short of the Workman-Director, profit-sharing and even co-partnery lack the guarantee of permanence. The glowing words of Jules Simon, quoted by M. Hedde, may be borrowed for use in this connection, "poor and soured by their poverty, ignorant and ashamed of their ignorance, workmen always fear being deceived or exploited. Words cannot dispel their error; they must be persuaded by the long and sure system of institutions." The surest means an agitator can adopt for playing upon the passions of working people is to tell them that they are being "put upon." Hitherto there has been nobody of their own order to cite as the living refutation of this slander upon employers. Promotion of workmen to be foremen and masters of their own works does not meet the case, for obvious reasons; but a director of a great company, who is at the same time a workman, belongs to a different category. He is the best "institution," in the sense of Simon's phrase, to convince the workman that he shall not be defrauded of his rights.

**Gas v. Steam Engines as Electric Power Producers.**—Professor Krone, in a communication recently presented to the Société Electro-Technique of Hanover, claims to have established a comparison between the cost of electric power produced by steam and gas engines. According to his figures, the cost of an electric horse-power-hour is 16 per cent. less with a gas than with a steam engine. The author describes a small electric station installed at Clausthal. It has two gas generators and two engines of 70-horse power each, making 140 revolutions per minute. The engines run with great regularity, as evidenced by the fact that when one-half the load is thrown off, the speed does not rise more than 3 per cent. These engines are connected directly to two dynamos of 46 kilowatts each. During one year the quantity of combustible (anthracite and coke) necessary to produce 1 horse-power-hour of electric energy averaged about 2·3 lbs.

## CONCILIATION IN TRADE DISPUTES.

The revival of labour troubles which has been recently witnessed, and the terms of settlement which brought to a close the most serious of the actual stoppages of work—the strike on the Taff Vale Railway—serve to call public attention once more to the barbarism of the method of settling trade disputes by recourse to strikes or lock-outs; though, unfortunately, in these days, when the prayer seems to be "Give us this day our daily sensation," public attention is rarely centred upon any subject for a sufficient period of time to produce any good result. This is why inconvenient questions to which more attention is being given than is relished by the powers that be, are so frequently relegated to the leisurely consideration of a Royal Commission. It is calculated—and, in most cases, only too correctly—that by the time the august body of Commissioners have decided upon their procedure, have heard witnesses, adjourned for a few months now and then, and have finally agreed upon a report, the public will have consider ately allowed their interest to be diverted to other newer topics; and the end sought will have been achieved. The interest aroused of late in the subject of conciliation *versus* strikes as the means of determining disagreements between employers and employed has, we fear, been but fleeting. The occasion may, however, be well taken by those whose interest in the question is direct, and something more than that of only partially affected spectators, to once more consider the likelihood of the more rational method superseding the barbaric, and the conditions precedent to that most desirable consummation.

There is now, we believe and hope, a growing, if not strikingly apparent, tendency on both sides to adopt the more peaceful and less costly procedure of referring matters in dispute between masters and men to a Conciliation Board or Committee. Several such bodies are in regular operation in some of our leading industries—especially in the coal and iron trades—and are productive of excellent results. The Board to be instituted as the outcome of the Taff Vale dispute will, it is to be hoped, prove that the method of reference to a representative body can be successfully applied to an industry so vast, and so diffused, as that carried on by the great railway companies of the kingdom. We have spoken of a "representative body," advisedly; for that, as is pointed out by a correspondent of "The Times" in a recent article dealing with the subject, is a prime necessity. It is absolutely essential to the success of a Conciliation Board that the members thereof should be drawn from, and really represent, the men concerned in the disputes to be settled by it. The Taff Vale Directors showed their appreciation of the necessity of dealing with the men themselves, instead of with the official of a Union not primarily representing the employees concerned, but intervening as third parties in the dispute, by refusing to recognize the authority of Mr. Bell to negotiate with them on behalf of the men; and they were right.

It was argued by some of the journals who always start with the assumption that the men have justice on their side in any trade dispute, and by others of whom one might have expected more logical sense, that the Taff Vale men had as much right to be represented by Mr. Bell as the Directors had to represent the shareholders. But the Directors of a company are actually shareholders, with, necessarily, a substantial stake in the undertaking; whereas Mr. Bell was not even a Taff Vale workman, and had no interest whatever in the dispute, other than that of winning a victory for the glorification of the Society who employ him. Directors, moreover, are not only individually shareholders, but for all administrative purposes they are the shareholders—that is to say, they are the only executive shareholders, and their acts are the acts of the whole body. The demand of the Taff Vale men to be represented by the Secretary of the Amalgamated Railway Servants Society was equivalent, not to the representation of the shareholders by the Directors—in other words, by themselves—but to those Directors claiming to be represented by some official of an Amalgamated Railway Shareholders' Protection Association, who would have had no personal interest whatever in the affair. It may then be taken to be an essential feature of a Conciliation Board that it should be truly representative. If its jurisdiction extend over more than one firm, care must be taken that the employees and the partners or directors of each business concerned are duly represented.

It is, furthermore, very necessary that the representatives of both sides should also be plenipotentiaries. This need is very clearly put by the correspondent of "The Times" to whom reference has already been made: "No settlement of a difficulty often involving intricate and complicated details is probable, or even possible," he writes, "save by a discussion of the points at issue between persons who are either plenipotentiary or at least empowered to determine all but questions of great principle. It is impossible to discuss satisfactorily complicated differences, if point after point has to be referred to mass meetings of men who have heard no arguments, and have no means of appreciating concessions made by the other side. Herein lies one of the greatest obstacles to the success of Conciliation Boards. The representatives of employers, as a rule, know that their decisions will be supported; the representatives of the employed are too often obliged to accept a decision *ad referendum*, only to find themselves thrown over by those who sent them to negotiate. The good sense of Englishmen may be trusted to reduce the effect of this obstacle as time goes on; but at present it unquestion-

ably operates, not only to deter employers from entering into conference, but to discount the effect of conferences when they take place."

Another objection that can always be urged, in theory, against Conciliation Boards and Committees is the impossibility of enforcing their awards without the aid of some compelling power. This theoretical objection, like many others, is not found in practice to be so formidable as it appears. Awards are constantly being made by such bodies, and are almost invariably accepted loyally by both parties. If any means of enforcing acceptance be deemed necessary, there is always open the plan adopted in the boot trade—of the men and their employers severally depositing sums of money, out of which fines for non-acceptance or breaches of the Conciliation Board's awards can be paid. As a rule, however, the Englishman's honourable preference for keeping to a bargain will prove to a large extent efficient.

In regard to the settlement of trade disputes by means of Conciliation Boards, as to every other point of difficulty that arises in the course of the employment of large bodies of men, it may be said that patience, common sense, and fair dealing with the men will accomplish much—above all patience. We hope that the pacific influence of the bodies already established for the adjustment of labour troubles may be increasingly felt, and that more such institutions will be created. As Lord Avebury recently said at the Paris gathering of the Association of Chambers of Commerce, we are looking to these Boards to diminish the unfortunate strikes which are injurious to capital and to labour. Lord Avebury added: "It is my conviction that, if there had never been a strike in the United Kingdom, wages would now be higher than they are. Strikes have tended to diminish the confidence which is felt by investors; they have driven a large amount of capital abroad; and if it had not been for the fear that money invested would not receive a reasonable remuneration, I am firmly convinced that we should have had more manufacturing enterprise and a greater development of the railway system in our country, which would have involved a greater demand for labour, and consequently an increase in the rate of wages." We wish the British working man would put that in his pipe, and smoke it.

## THE CHAMBERS OF COMMERCE IN CONGRESS.

From the reports that were given in the Daily Press of the proceedings at the Congress of the Chambers of Commerce of the United Kingdom recently held in Paris, it was possible to gather that those proceedings were of considerable interest; but as the reports were, in consequence of the pressure on the columns of the newspapers, extremely meagre, we deferred any notice of the speeches delivered at the congress until fuller accounts were to hand. The "Chambers of Commerce Journal" has now published a full report of the meetings in the form of a supplement to the October issue; and we are able to note the points that are of interest to our readers, who are, most of them, very closely concerned with the commerce of this country.

Nothing, we firmly believe, could have done more to promote mutual respect and friendliness between this nation and her nearest neighbour, and to remove their mutual suspicions and misunderstandings, than the series of gatherings of leading English professional men and merchants representing our principal industries that has recently been held in Paris. Englishmen have been led to see, more clearly than before, that the froth of the Parisian journalist is not the voice of the French people; Frenchmen to see that the said journalist is even wider of the mark in his daily descriptions of the perfidious Englishman than they had previously realized. As Mr. Lionel Holland said at the inevitable banquet which terminated the visit of the delegates to Paris, the reception accorded to the Association "was proof positive of how hollow was the notion that there was any lack of cordiality in the relations between France and England." Lord Avebury, speaking on the same occasion, took pains, moreover, to show that, not merely is there no cause for hostility between the two nations, but that there is in their case a most cogent argument in favour of peace—namely, that each is a very large customer of the other, and that the cessation of that commerce would be even more costly to both nations than the tremendous expenditure that would be entailed by a war between them. As Lord Avebury pointed out, 20 per cent. of the total imports into France are purchased from England—representing annually the sum of 700 million francs—while we buy from France goods to the value of 1200 million francs, or one-third of her total exports. It is, therefore, evident that the prosperity of France is advantageous to England, and the prosperity of England still more so to France. It may not be strictly within the province of a technical publication such as the "Journal" to refer at any length to questions of international relations; but so much ill-considered, and therefore mischievous, language has been used, not only in the editorial and correspondence columns of many of the loose-tongued and some of the better-class newspapers in this country, but also in the correspondence columns of our own and other technical journals, in regard to the advisability or otherwise of Englishmen visiting the Exhibition in Paris, that we may be pardoned for going out of our way to emphasize the grave responsibility that must rest upon the shoulders of all and each of those who at any time shall think fit to use provocative language in regard to, and unduly magnify, the utterings of men whom the French people themselves really hold to be beneath contempt.

To turn from questions of international manners to the real business of the congress. The President's Inaugural Address was commendably short. The Companies Act passed during last session was mentioned as deserving of approval; but Lord Avebury wisely pointed out that too much must not be expected of such legislation, as the power of Parliament to protect fools from their own folly is necessarily limited, and that so long as British investors can be found to trust strangers who make flowery promises of immense profits and high dividends, nothing Parliament can do will be able to prevent bogus companies being brought into existence. Human nature is a factor that no statute has ever succeeded in eliminating, and which no statesman can ignore. In regard to no problem is this more true than in regard to that sought to be dealt with by another measure (not yet beyond the stage of discussion) to which Lord Avebury referred—namely, the Prevention of Corruption Bill, "in which the Chambers of Commerce have taken considerable interest." The Municipal Trading Committee was mentioned by the President as being the outcome of steps taken by the Association; but as the Committee have not completed their labours, Lord Avebury, whose views on the question of municipal megalomania have recently been the subject of notice in the "Journal," did not enlarge upon the evidence so far taken. Brief references to the present prosperity of this country, and the threatening dangers thereto from two different classes of warfare—war between country and country, and war between employers and employed—the hospitality of the French people, and the opportunity afforded by that and similar congresses in Paris to maintain and increase the good feeling at present existing between Great Britain and France, closed the Inaugural Address.

The first subject on the *agenda* for discussion was one affecting the gas industry, in common with all other undertakings dependent for their success upon the intelligence and knowledge of their servants—viz., that of Technical and Commercial Education. This was introduced in a very able speech by a staunch advocate of wider opportunities for the acquirement of technical training, Sir Albert K. Rollit, M.P. The Paris Exhibition, he remarked, was a splendid object-lesson in the advantages of commercial education, and in the benefit of knowing another language than one's own. In fact, the Exhibition might truly be said to afford a liberal commercial education in itself. The ideal to be set before the nation, said Sir Albert, is not to teach business or commerce to boys, but to build up a basis of sound general knowledge, by means first of the ordinary mental discipline of the schools, and then by the teaching of special subjects and the encouragement of habits of correctness and exactitude. For this purpose, more money is needed, and, said the speaker, none could be more wisely and profitably expended. Other countries are spending money freely on this subject. "Are all those countries wrong in the expenditure of their funds, and are we right in doing comparatively little?" Mr. Hemelryk, of Liverpool, who seconded, and Mr. Millar, of Edinburgh, who supported the resolution (urging the extension of technical and commercial education, the representation of Chambers of Commerce on Boards of Education, and the granting of financial assistance by the Government), did not add much of value to the discussion. In fact, the two suggestions made by them—the one that school holidays should be shortened, and the other that boys should be sent to business first, and then taught commercial subjects at night schools—will by no means commend themselves to everyone. "All work and no play," is not good for anyone, least of all for boys.

A discussion took place, but no definite conclusion was arrived at, upon the weak spots in the Bankruptcy Laws, not the least of which is the difficulty of ascertaining sometimes what is and what is not the law. "If," said Sir Albert Rollit, "they could reform parliamentary procedure by getting more consolidating Acts passed, that would be one of the greatest reforms possible." And in no case is consolidation more needed than in the Bankruptcy Laws. Anyone who has had much experience in dealing with cases of bankrupt gas consumers will heartily endorse this expression of opinion. Parliament, said Sheridan, first passes an Act, then it passes an Act to amend that Act, then another Act to amend the Act amending the Act, and then another one to explain certain clauses in the Act, adding certain clauses to the Act amending the Act, and so on. An exaggeration, doubtless, but with a large substratum of truth.

Upon the consideration of the Workmen's Compensation Act, it was resolved that any future amendment of this Act "should provide (*a*) for a clearer definition as to what constitutes contributory negligence within the meaning of the Act, and (*b*) for the framing of rules of procedure which will limit the increasingly large number of vexatious and frivolous claims to which employers are subject, and reduce the costs frequently exacted from claimants." The mover of the resolution, referring to Sir Albert Rollit's remarks as to the need of more consolidating Acts, said that in the matter of employers' liability such consolidation was badly needed. "As a matter of fact, employers and the insurance companies at the present time were not attacked under one particular Act, but under two or three. Notices of cases were usually given under Common Law, the Employers' Liability Act of 1880, and under the Workmen's Compensation Act; so that if the unfortunate employer could not be tripped up

by one Act, he could be knocked down by the other." Allowing for some extravagance of language, this is undoubtedly what is frequently done; and it is essential that employers should know more clearly than they now do the extent of their liabilities.

As to the first half of the resolution, it must be remarked that it is easier to say that a clearer definition of contributory negligence should be provided than to lay down such a definition. The circumstances of every individual case must be considered; and no definition can be drawn which would make clear what is and what is not gross, wilful misconduct beyond the possibility of dispute, in the majority of cases. The second part of the resolution is more practical. Something could, and should, be done to prevent the exploiting of workmen's claims for the benefit of no one but firms of pettifogging attorneys. "Men calling themselves solicitors, but entirely unworthy of the name, were," said the mover, "going up and down the banks of the Thames urging workmen to bring actions," working on the "no damages, no costs, but 50 per cent. or more of any compensation obtained" principle. That such is the case, we can confirm of our own knowledge. It would be very difficult to prevent such rascality; but the exacting of a guarantee of costs in more cases, or the requirement of an affidavit from the solicitor of the terms of his agreement with his client as to costs, might put a stop to many faked-up actions. It is an absolute fact that men often lose heavily by falling into the hands of these legal sharks; for the employer who is not legally liable, but who intended doing something for the man, will naturally shut his purse and put up his back when Mr. Sharp Attorney comes on the field.

Numerous other subjects were discussed during the four days of meetings; but, except a resolution urging the Government to adopt the metric system of weights and measures in the Government Departments, none can be said to be of sufficient interest to our readers to warrant mention in these columns.

## WATER ACTS FOR 1900.

THE following Acts relating to water supply were passed in the last parliamentary session:—

The Great Berkhampstead Water Act incorporates and confers powers upon a limited Company formed in 1864. The limits of supply are defined as being a circle of 3 miles radius from Great Berkhampstead Parish Church, with the exception of Chesham, which is only to be supplied by consent of the District Council. The existing share capital of the Company is consolidated and converted into 4 per cent. stock, with the addition of £40,000, and with one-fourth loan on both classes of stock. The Company are not to take any water from the River Thames or its tributaries, or from any land within 500 yards of the river, without the consent of the Conservancy. Metered supplies may be charged at the rate of 1s. 6d. per 1000 gallons.

The Higham Ferrers Water Act incorporates a Company for supplying with water the borough named, in Northamptonshire. The supply is to be made effective within three years. The capital is £72,000, with one-third loan. The water-works include a storage reservoir on the Sywell brook, a pumping-station in the parish of Mears Ashby, and a service reservoir in the same parish. The Sywell brook is a tributary of the Nene; and compensation water is to be provided at the rate of 100,000 gallons per day. The works are to be completed within five years. The Local Authorities within the limits of the Act may jointly, but not otherwise, purchase the undertaking, after 20 years. Clauses are inserted for the protection of the Wellingborough Rural District Council. The Rushden District Council are to be supplied in bulk. Rates for domestic supplies range from 9 to 6 per cent. The maximum price for meter supplies is to be 1s. 6d. per 1000 gallons. The Northampton Corporation are protected.

The Woodbridge District Water Act incorporates a Company for the supply of parts of the parishes of Woodbridge and Melton lying to the westward and northward of the Great Eastern Railway. The supply is to be made effective in four years. The capital of the Company is £20,000, carrying a 7 per cent. dividend, with one-fourth borrowing powers. The water-works are to consist of a well and pumping-station and service reservoir in the parish of Woodbridge, to be completed within four years. The supply is to be constant, and at such a pressure as shall carry the water 30 feet above the highest land in the district. Rates for domestic supplies range from 8 to 6 per cent. The Company are to sell their undertaking to the District Council on requisition, subject to the consent of the Local Government Board.

The following Acts confer additional powers on the Companies named.

The Bristol Water-Works Act extends the powers of the Company for the protection of the purity of their supplies. The Company are authorized to make and enforce bye-laws for the regulation of any of their drainage areas outside the City boundaries. The Company are to compensate any landowners or occupiers injuriously affected by their bye-laws, which are not to interfere with the rights of the Bristol Gas Company under the Act of 1847 or any other statute. Certain sewering agreements of the Company with the Rural District Councils of Axbridge and Clutton are scheduled and confirmed.

The Dorking Water Act empowers the Company to raise £16,000 of additional capital, to include a sum of £2235 overspent on capital account. Dividends are to be 7 per cent. ordinary or 5 per cent. preferential. Borrowing powers are in the proportion of one-fourth. Additional lands are to be acquired by agreement. Certain works constructed are confirmed. The Local Authorities may promote a Purchase Bill in the next two sessions. The Company pay one-half of the Local Authorities' expenses on their opposing petition.

The East London Water-Works Act authorizes the Company to construct two additional storage reservoirs for collecting the water of the River Lea. The necessary land is to be compulsorily acquired within five years, and the works must be completed within seven years. Clauses are inserted for the protection of various interests and local authorities. Special provision is made for emergency supplies. An excess of water may be temporarily taken by the Company from the Thames. Molesey Weir is to be adapted to the purpose of measuring the flow of the river. The Company may raise £1,800,000 of new capital as 3 per cent. debenture stock, under the customary conditions applying to the stock issues of the London Water Companies. The Act is not to be regarded as increasing the capital value of the undertaking in the event of purchase by a public authority within seven years.

The Lambeth Water-Works Act enables the Company to raise additional debenture stock to the value of £750,000 under the usual conditions, as in the preceding Act. An additional reservoir at East Molesey is to be constructed within seven years, with connections from Molesey to Surbiton. The Company are to maintain for three years the roads through which their trunk mains pass. Many protecting clauses are inserted in the Act. Excess water may, under particular conditions, be taken from the River Thames. The water required for the first filling of the reservoirs is to be paid for at the price of 10s. 3d. per million gallons, and is not be reckoned as excess water.

The Mid-Kent Water Act extends the limits of supply of the Company to numerous parishes, to be made effective in five years. A special provision is made for main-laying in the parish of Chilham. The authorized works include wells and pumping-stations in the parish of Charing. The provisions of the Act of 1847 as to the repair of roads are amended. The East Ashford Rural District Council are protected. The Ashford Urban District Council have also secured special terms. The Company have a general power to acquire wells and water-works within their limits of supply. Additional capital to the amount of £40,000 is to be issued, with one-fourth loan.

The North Pembrokeshire Water and Gas Act enables the Fishguard Company to enlarge their undertaking and supply the parishes of Newport and Dinas, in Pembrokeshire. The name of the Company is accordingly changed. The additional water-works comprise a reservoir for impounding the waters of the Pont Caen brook, and a service reservoir at Llanllawer. The capital powers of the Company are increased by £40,000.

The North Warwickshire Water Act enables the Company to extend their limits of supply over a number of parishes, to be made effective in three years. Additional wells and pumping-stations are to be constructed in the parishes of Meriden and Stoneleigh, to be completed in seven years. Drainage agreements may be entered into, and contracts made for supplies in bulk. Nothing in the Act affects the rights of the Corporation of Coventry to sink wells in the district; and the Company are forbidden to sink a well within 1½ miles of the village well of Berkswell. The rate for public supplies is 9d. per 1000 gallons. Additional capital is sanctioned, to the amount of £48,000 of 7 per cent. ordinary or 5 per cent. preference capital, with one-third loans. Local authorities may purchase their portions of the undertaking in ten years, jointly or separately.

The Rickmansworth and Uxbridge Valley Water Act extends the Company's limits of supply over a scheduled area. The amount of water taken from the valley of the Colne is limited to 300,000 gallons per day. Records of the rise and fall of the water in the wells are to be kept when the pumping exceeds 1,000,000 gallons per day. The maximum price for metered supplies of water is 3s. per 1000 gallons. The Company may raise £150,000 of additional 7 per cent. capital, with one-fourth borrowing powers. Numerous water and other local interests are protected.

The St. Albans Water-Works Act authorizes the Company to acquire further lands, and make an adit leading into their pumping-station at Holywell Hill. The Company are forbidden to take any water from a tributary of the River Thames without the consent of the Conservancy. If the Company's pumping operations affect the River Ver, compensation is to be made. The water is to be laid on constantly, under such pressure as the Stone Cross reservoir affords. New capital to the amount of £60,000 is authorized, with one-fourth loan.

The Southport Water Act sanctions the construction of additional works, including a service tank in the parish of Aughton, and a high-level pumping-station, with water tower and tank, in the same parish. The Company may raise £40,000 of 7 per cent. capital, with one-fourth loan. The Act is not to enhance the transfer price of the undertaking as against the Joint Board for Southport, Birkdale, and West Lancashire, who may promote a purchase Bill next session.

The Westgate and Birchington Water Act defines and extends the limits of supply. A new adit is to be made at the Company's existing works; and another adit is sanctioned. The new works are to be completed within five years. The Company may

raise £20,000 of new 7 per cent. ordinary or 5 per cent. preference capital, with one-fourth loan. Part of the water-works property of the Margate Corporation is to be sold to the Company. Within two years the Isle of Thanet Rural District Council may take unopposed steps to acquire the undertaking.

The Wetherby District Water Act extends the limits of supply, and authorizes the construction of a well and pumping-station in the parishes of Thorner and Barwick. The works are to be completed within seven years. The capital is increased to £85,000, with correspondingly greater borrowing powers.

## THE CHEMISTRY OF ENGINEERING MATERIALS.

THE man who is engaged in the practice of general engineering is usually far too much concerned with the physical properties of the materials which come to him in the course of his business to inquire very closely into their chemical composition. Yet these properties are to so large an extent dependent on the chemical composition, that experiments on the former must always lead to unsatisfactory, if not absolutely incorrect, results if due regard is not paid to the latter. These considerations, taken in conjunction with the fact that most text-books devote little space to the chemistry of materials, led Mr. A. Humboldt Sexton, of Glasgow, to prepare a handbook thereon which has just been published.*

In the course of his introductory remarks, the author points out that the chemical questions likely to be of interest to the engineer, or which may arise in his practice, are the composition of the materials, the changes that may be brought about therein by the treatment to which they are subjected in the process of manufacture, the action of the various substances with which they may be brought in contact when in use, and the changes which take place in the processes of manufacture, by which various constituents are taken up or eliminated, and the materials assume the form in which they are used. Having offered some remarks on these matters, he proceeds to classify materials in two groups—metallic and non-metallic. In the former are the metals and the alloys; in the latter, structural materials, fuel, water, lubricants, paints, &c. In dealing with the first group, he very naturally gives the foremost place to iron—treating of its chemistry, sources, and manufacture—and then goes on to steel, the hardening, tempering, and preparation of which he explains. The working of the two metals is next considered; and a chapter is devoted to the subject of their protection from rust. Four methods are indicated—(1) coating with other metals, (2) with oxide films, (3) with paints or varnishes, and (4) enamelling. Painting is the almost universal plan adopted for protecting iron and steel from atmospheric corrosion; and the author acknowledges that, if well done, it is attended by fairly satisfactory results. Of all the pigments in use, the most suitable, when the paint is required as a preservative, is red oxide of iron. It is not only very stable, and possesses good body, but has no action on the metal. After dealing with the microstructure of iron and steel, the author considers successively the physical and chemical properties of lead, zinc, tin, &c., and then devotes a chapter to the alloys.

The group of materials next taken up are non-metallic—wood, stone, &c., clay ware, bricks, tiles, &c., cements, and mortars. Wood is specially valuable for structural purposes owing to the ease with which it can be worked up. But, of course, the nature of its constitution renders it liable to decay. It therefore needs preservation; and creosote is the best agent to employ. Stone used for building purposes is exposed to the air in all weathers, and is consequently subject to the corrosive action of moisture, carbonic acid, and other acids in the atmosphere of towns, as well as to the disintegrating action of frost. Chemical analysis helps to the formation of a judgment as to the probable durability of this valuable material. With regard to its preservation, the author does not consider that any of the agents used have been an unqualified success. His remarks on clay and clay ware (including fire-bricks) are interesting; and so are those on mortars and cements. As to the last-named material, he is careful to explain that chemical analysis alone does not give conclusive evidence as to the quality of a cement. Fuel is the next subject; the influence of its constituents on its heating power being clearly set forth. Coal—the universal fuel—is first taken, and its varieties described; then solid prepared fuels, including coke. In connection with the manufacture of this material, drawings are given of the beehive and what is incorrectly called the "Simon-Carve" (meaning, of course, the Simon-Carvès) oven. Liquid fuel is briefly dealt with; and then the author passes on to gaseous fuel, which he says offers so many advantages that it is rapidly coming into use wherever suitable gas can be obtained at a sufficiently cheap rate. The various kinds of gas—coal, producer, Mond, water, and oil—are next considered; the second being described at the greatest length. Illustrations are given of the Siemens, Thwaite, Wilson, and Dowson producers, as well as of water-gas plant. The author acknowledges that producer gas could never have come into successful use had it not been for the introduction of the regenerative furnace by Siemens. This furnace is described and illustrated. The remaining chapters are devoted to water and its analysis, lubricants, paints and varnishes, and minor materials. In connection with the first-named subject, some remarks are offered on the prevention of scale; purification of the water before it enters the boiler being recommended as the best remedy for this trouble.

The text of the book, which occupies 332 pages, is freely illustrated. It covers ground previously unoccupied, except by larger treatises beyond the reach of ordinary students, for whose use it has been specially prepared; no higher claim for the work being made by the author than that of serving as an introduction to more important books on the subject.

* "The Chemistry of the Materials of Engineering." A Handbook for Engineering Students. By A. Humboldt Sexton, Professor of Metallurgy in the Glasgow and West of Scotland Technical College. Manchester: The Technical Publishing Company, Limited; 1900.

## PERSONAL.

Mr. PERCY S. HOYTE, Engineer and Manager of the Plymouth and Stonehouse Gas Company, was married on the 8th inst. to Miss Margaret M. Fannie Hutchison, of Glasgow; and last Wednesday he was presented by the Company's employees with a handsome eight-day clock as a wedding gift. The presentation was made by Mr. J. Ward, the foreman, who congratulated Mr. Hoyte on his appointment as Engineer of the works, and wished him and Mrs. Hoyte much happiness. Mr. Hoyte, in reply, thanked the men for their gift, and for the kindly feeling which had prompted it, and said that he should endeavour to foster a good understanding which it was desirable should exist between the Engineer and the men.

## OBITUARY.

The death is announced, in his 69th year, of Mr. RICHARD MELLOR, Chairman of the Meltham Gas Company. Deceased was for twelve consecutive years—from 1887 to 1899—Chairman of the Local Board and the Urban District Council.

A remarkable career has closed by the death, last Tuesday, of Mr. GEORGE CRAVEN, of Rochdale. He was in his 93rd year. The point of interest in his life which may be mentioned here is the fact that he was the Chairman of the Lighting Committee of the Board of Commissioners for some years prior to the acquisition of the gas-works by the town in 1844. There was a bitter quarrel between the Commissioners and the Gas Company, who were then charging 7s. per 1000 cubic feet for gas. Failing to get the terms they desired, the Lighting Committee refused to have the Company's gas, and for a considerable time oil-lamps were again burned in the streets.

**Institution of Civil Engineers.**—The meetings of the Institution will be resumed on Tuesday, the 6th prox., at 8 p.m., when the President, Mr. James Mansergh, will deliver his Inaugural Address. After the presentation of medals recently awarded by the Council, he will hold a reception in the Library.

**The Gas and Water Works Directories for 1900-1901.**—We have received from Messrs. Hazell, Watson, and Viney, Limited, copies of the above-named works, which have just been issued. This is the 24th edition of both works, and we learn from the title pages that the contents have been revised up to August last. The Editor states in his preface to the Gas-Works Directory that the revision "has been of a most exhaustive character; every effort having been made to get the latest returns and the most recent changes in the price charged for gas." These, as we know, have been numerous—in fact, unprecedentedly so; and it is to be hoped that use of the book will afford ample proof that they have all been duly recorded. In recent years, the Electrical Section has been bound up with the Gas Section. Owing, however, to the increased number of electric light undertakings in operation, it now forms a separate volume. In addition to the statistical and other information furnished as to English and Foreign gas and water works, the directories contain lists of the officials connected with them, and of the Associations of Gas and Water Engineers and Managers.

**A Reservoir Bank Injured by Lightning.**—Mr. Clark Olds, the President of the Erie (Penn.) Water Board, has called attention, in the "Engineering Record," to an accident which happened to their reservoir, as a possible means of explaining one cause for the bursting of dams. The reservoir has a capacity of 32 million gallons, and is constructed with earthen embankments 27 feet high, lined with brick, grouted in portland cement, on a clay puddle a foot thick. One evening last June, lightning struck the embankment near the south-west corner, and tore a hole downwards, at an angle of 45°, which emerged in the lining of the reservoir just at the water-line, splintering the brick so as to require a patch about 2 feet square. The hole on the surface of the embankment was about the size of a rat-hole; and the sod was cut in furrows for some distance round it. On account of the heavy rain which accompanied the thunderstorm, the engineer had slowed down the pumps, and the surface of the water in the reservoir had fallen slightly during the night. If it had risen, the embankment would probably have given way before morning without any apparent cause, as the damage was not discovered till daylight.

## COMMUNICATED ARTICLE.

### PRACTICAL NOTES ON GAS MANUFACTURE.

By S. Carpenter, of East Ham.

(*Concluded from p.* 953.)

Further Notes on Purification—The Use of Air.

Much has been said as to the best way of using hydrate of lime for the purification of gas from carbonic acid and bisulphide of carbon. It will not be out of place now to notice the different methods which have been employed for the purpose. First, the crude gas was passed into the purifier charged with oxide of iron, and partly purified from sulphuretted hydrogen; then it was sent on to the lime purifiers, for the removal of the carbonic acid and part of the bisulphide of carbon; and afterwards to the oxide of iron purifiers to take out the remaining sulphuretted hydrogen. As the oxide can only remove the last-named impurity, instead of doing good, it only interferes with the chemical action of the lime on the gas. Subsequently another method was tried—viz., to put one layer of oxide of iron and one of lime in each purifier; but this also affected the lime. A third plan was to send the crude gas through cream of lime; but this was of no use. Finally, the gas was passed into two purifiers charged with hydrate of lime before it entered the oxide purifiers; and this was found to be the only practical way of using the material for purification. The gas was decarbonated, and the bisulphide of carbon reduced to about 10 or 12 grains per 100 cubic feet.

It has been said that the best way to employ atmospheric air in connection with purification is to draw it into the vacuum main, and mix it with the gas before it enters the lime purifiers, as this will cause the lime to be more active in taking the bisulphide of carbon out of the gas; but, after thirty years' practical experience, the writer is bound to say that air should not be allowed to get into the lime purifiers. If it is, the result will be that the oxygen will break up the sulphuretted hydrogen, fixing its sulphur in the lime, and setting the hydrogen free. It would be done in this way: The oxygen of the air would oxidize into water the hydrogen contained in the sulphuretted hydrogen, and at the same time set free the sulphur, which gets fixed in the lime in the purifier. And instead of the lime becoming hydrogenated sulphide of calcium, which has a powerful affinity for bisulphide of carbon, it becomes hydrated sulphide of calcium, derived from the decomposition of the sulphuretted hydrogen by the air; and the lime in the purifier would be almost converted into pure sulphide of calcium—a compound which has little or no affinity for bisulphide of carbon. Moreover, it is very probable that the nitrogen of the air would unite with the hydrogen to produce ammonia, or with carbon to form cyanogen.

The writer is aware that it is a great saving to use atmospheric air in purifying gas, in order to keep the oxide of iron in an active state for removing the sulphuretted hydrogen. But, as pointed out in a previous article, it must be admitted at the right place, which is at the inlet of the first oxide purifier—the quantity being from 1½ to 2 per cent. By using the air in this way, the oxide will purify about three times as much gas as it otherwise would. The object of the writer's method of working lime purifiers is to decarbonate the gas, and to effect absorption of the bisulphide of carbon by the alkaline sulphide of calcium. The bisulphide is a sulphur acid in its nature, and the sulphide of calcium is alkaline, and has great affinity for the sulphur acid in the crude gas. It neutralizes part of the bisulphide of carbon, and reduces the amount of this impurity. As much of it as possible should be removed from the gas. When it is present in large quantities—say, from 15 to 30 grains per 100 cubic feet of gas—it gives rise to sulphurous acid during combustion; and by taking more oxygen from the air, it becomes sulphuric acid. If there is any ammonia in the gas—say, from 2 to 4 or 5 grains per 100 cubic feet—it will become ammonium sulphate, which is very corrosive. Either of them will rapidly destroy any textile fabric—especially paper and linen—and all kinds of brass.

To sum up, take out of the gas all the ammonia, as it will interfere with the chemical action of the lime; all the carbonic acid, as its presence lowers the illuminating power of the gas; as much as possible of the bisulphide of carbon, as it has a deleterious effect upon the air of a room; and all the sulphuretted hydrogen, as this impurity will cause blackening of ceilings.

The Size of Lime Purifiers in Relation to the Make of Gas.

Where lime is used for purification, the writer's advice is to utilize the purifiers to the best advantage. This may be done in the following manner: In each of the boxes have, if possible, four tiers of grids, and on each tier have the lime about 4 inches thick. Four thin layers are better than two thick ones from 8 to 9 inches deep, as it is surface rather than thickness of lime that is required, because the gas should pass more slowly through the lime for the removal of bisulphide of carbon than the other impurities. Having four layers of lime in small purifiers will be very helpful, as there will be four surfaces of the material instead of two. The layers of oxide of iron should be from 12 to 18 inches thick. There is a great difference between lime and oxide of iron, as the former will remove three impurities from the gas, whereas the latter only takes out one.

When erecting new purifiers for lime, they should be made one-third larger than those for oxide of iron, so that the gas may pass slowly through the material. It is also to be observed that the displacement of the sulphuretted hydrogen from lime by carbonic acid depends to a considerable extent upon the rapidity with which the gas is passed through the sulphuretted lime. For example, when carbonic acid is brought slowly into contact with lime in the form of sulphide of calcium, nearly the whole of the sulphuretted hydrogen will be expelled before the carbonic acid appears in the issuing gas; whereas if the carbonic acid is brought more rapidly into contact with the lime, a large portion of the sulphuretted hydrogen will remain behind. If the gas is passed too quickly through lime, it cannot properly perform its chemical function on all the impurities. Where practicable, it is well to have large purifiers, so that they may be equal, owing to their greater superficial area, to passing the gas at a slower rate. Where there are only two layers of lime, the gas has a tendency to creep up between the side of the purifier and the lime; and if there are any weak places, the gas would pass through the material much more quickly there than at the other part of the layer. If there are four layers, there is not this tendency; and if there should happen to be a weak place, it is only 4 inches instead of 8 or 9 inches deep.

If the lime is properly laid on the grids, the gas will not have the "creeping" tendency just referred to, nor will there be any weak places in the material. Care should therefore be taken, when laying the lime, not to shoot it on to the grids direct, as this will cause it to lie thick in the place where it has been shot. To obviate this trouble, it should be laid in this way: Place on the grids a piece of board about a yard square, then shoot the lime on to the board, and remove it with a shovel to the grids. The lime will not then be heavier in one place than another. After the gas has passed through the first layer of lime, there will not be so much carbonic acid for the second to take out; it will consequently remove a larger portion of the sulphuretted hydrogen. The gas which passes into the third layer will contain very little or no carbonic acid for a while; and then the lime in that layer will become temporarily hydrogenated sulphide of calcium, and that in the fourth layer will be converted into this material, and the bisulphide of carbon reduced to about 10 or 12 grains per 100 cubic feet of gas. Two lime purifiers will be sufficient for any make of gas; but the size will, of course, be suited to the production.

Recapitulation and Conclusion.

In this short series of articles the writer has traced the crude gas from the hydraulic main first into the condensers, where it is cooled, and where the tar and watery vapours are deposited from these vessels through the scrubbers, to take out the ammonia and arrest portions of the carbonic acid and sulphuretted hydrogen, and thence to the purifiers. He has shown that the purification of coal gas from ammonia, carbonic acid, sulphuretted hydrogen, and two-thirds of the bisulphide of carbon, can be accomplished without any great difficulty by adopting the method of working the lime and oxide of iron purifiers he has described. He believes that such a process of purification will be found not only more convenient but also more economical than any system of purification by means of lime, oxide of iron, and atmospheric air, apart from the great saving of labour effected by revivifying the lime, and using it a second time. He would again point out, however, that before attempting the purification of gas, the retort-house should be put in good order. The manager should see that there are no holes or chinks in the retorts, as the furnace gases, which contain sulphur and carbon, would pass over with the gas to the lime purifiers, and cause high results in sulphur other than sulphuretted hydrogen, by interfering with the chemical action between the crude gas and the lime. Instead of the lime reducing the sulphur, it would really increase it. Nor should air be allowed to pass into the lime purifiers. If either furnace gas or air enters the lime purifiers, it will be impossible to keep them under control. By working the purifiers in the way explained, no difficulty will be experienced in purifying the gas from carbonic acid, bisulphide of carbon, and sulphuretted hydrogen. In fact, if the conditions under which lime acts efficiently upon the sulphur impurity contained in the crude gas are fully understood, the purification of gas from carbonic acid and bisulphide of carbon becomes a pleasure rather than a bugbear; lime, as already remarked, being the best known agent for the purpose. All that has been here written upon the materials employed in the purification of coal gas, and upon the best method of conducting this operation, is the result of practical experience extending over about fifty years; and the writer's object has been, as intimated at the outset, to bring together a few notes which may prove useful to some managers, or to students preparing for the profession.

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Reference has already been made in the "Journal" to the wood gas produced in the Riché retort. Mr. James M. Neil, writing in the "Engineering and Mining Journal," gives the calorific power of the gas as 340·8 British thermal units per cubic foot, and that of water gas and coal gas as 324·5 and 590 units respectively. Each retort produces 180 cubic feet of gas; 1 ton of wood yields more than 25,000 cubic feet of gas and about 400 lbs. of good charcoal. The gas does not give an illuminating flame; but if a mantle is used, it furnishes a light of 50-candle power.

# THE INTERNATIONAL GAS CONGRESS.

## MECHANICAL CONVEYANCE OF COKE IN THE PARIS GAS COMPANY'S WORKS.

By M. Louvel.

[A Paper read before the International Gas Congress at Paris.]

Some few years ago the Paris Gas Company completely altered their coke-yards, and introduced mechanical means for effecting the greater part of the operations required for dealing with the coke, the annual make of which is over 15 million hectolitres. The object of this paper is to describe these mechanical arrangements.

Before examining each apparatus in detail, it may be interesting to point out the lines on which the various machines have been made. It was necessary, in putting up the plant, to utilize existing material and fittings. The carrying of the coke inside the stores was managed by wicker baskets and canvas sacks of 1 hectolitre, and by sheet-iron skips of 10 hectolitres. The baskets and sacks were carried on men's backs; while the skips were run on three wheels and lifted by cranes. The problem for solution, so as to effect all the operations by mechanical means, was complicated by the many different sizes of coke produced by the screens. They are five in number, and deliver to various parts (put the coke into carts, railway waggons, heaps, or take it to the stores). Further, the work is very irregular; and, when the cold weather comes on, the yards present a scene of great activity, so that it is necessary to allot to them all the men disposable.

Except for the filling of the waggons in bulk, which is done by the skips, all the coke operations are carried out in sacks containing 1 hectolitre, or 40 to 50 kilos. (88 to 110 lbs.). This small unit-weight allows one man to attend to the necessary movements at the beginning or end of the apparatus by himself, which he would not be able to do with a skip. A hectolitre of coke weighing from 40 to 50 kilos. can be handled in a sack weighing 2·5 kilos. (5½ lbs.), and carried in a basket weighing 11 kilos. (25 lbs.). When the sack is carried directly by a conveyor, the wrapping used for the transport weighs only 2·5 kilos., or 25 kilos. (55 lbs.) for 10 hectolitres. When, on the other hand, a sheet-iron skip is used, there is a dead-weight of 340 kilos. (750 lbs.) to carry 10 hectolitres of coke.

From the lightness of the weight carried (52·5 to 55 kilos, at the most), extreme lightness in the construction of the apparatus for the conveying of the coke is allowable. As the sacks are necessarily separated one from the other—owing to the unavoidable time taken in filling them—the conveyors only need to support, without the men required for the working, a permanent weight of 30 to 40 kilos. per metre run, which is very little. Under these conditions, without much expense, the girders may be made with large spans, and their supports may be placed as far as possible outside the coke-heaps—in positions where they will not impede the passage of the carts. The use of sacks allows, moreover, of adopting the "mono-rail" carried on light supports, which are easily moved and replaced.

The Paris Gas Company sought to construct very simple plant, without having any complicated gearing. All the machinery adopted requires the same fittings; and it is thus easy to repair any portion without having an elaborate supply of parts in the stores. It is also interesting to remark that the trials made, for several years past, prove that coke-dust does not cause any abnormal wear and tear, when the apparatus is properly kept up. The use of electrical dynamos, driven from shafting existing in the workshops, or from specially placed gas-engines (by giving power at isolated points in the yard), has allowed of various machines being adopted, which required to be started and stopped instantaneously, without the need of any special attendant. One of the great advantages of installing such machinery is being able to have at will either a small or great amount of motive power. As the men no longer carry heavy loads, and as their work is reduced almost to directing the sacks, they can produce very good results without fatiguing themselves.

Each apparatus will be examined separately. The names of those to be described are as follows: 1. Small truck for carrying the coke. 2. Automatic tip-cart. 3. Crane for the filling of waggons and different skips. 4. Transporters; bucket elevators for coke in bulk. 5. Stacking coke; sack-conveyors for carrying and stacking; rope transporter; mono-rails. 6. Conveyor; lifter; drier. 7. Hectolitre-charger. 8. Sack-lifter to back. 9. Portable elevator for taking coke from heap. 10. Machines and various apparatus.

I.—*Small Trucks for Carrying the Coke.*—These trucks are used to carry the coke from the quenching-yard to the hoppers feeding the screens. Their capacity is about 40 hectolitres. They weigh when empty 2600 kilos. (51 cwt.), and run only on rails. They are made up of a wooden frame, mounted on cast-iron wheels, and of a sheet-iron body, which can be swung on one side. The turning centre-line of the truck can itself be shifted in the arc-shaped guides, which causes the deadening of the shock, and the avoiding of lifting the wheels at the moment of tipping the waggon. One of the sides has a door with lugs which, on being lowered, forms a discharging shoot between the bottom of the truck and the hopper. The truck, having arrived at the right of the hopper, the door is lowered, and the tipping effected by means of a lever. The effort required is very slight, as the truck with its open door is all but balanced. The return of the waggon, and of the door, is carried out by means of a special lever made up of two unequal pieces joined together by a hinge. The labourer placed at the opposite side of the hopper puts his lever into a wrought-iron strap fastened on to the truck. He pulls it from top to bottom, and thus returns the truck on to the frame in its position for travelling. The hinge is so arranged that, in this movement, the two lengths of the lever remain in a line one with the other. It allows the labourer, after the return of the truck to its normal position, to fold up the piece which he keeps in his hand; the other length remaining in the strap. He then fastens to the moveable end a chain which, passing over two small grooved pulleys, is directly fixed to the flap of the door, and works downwards on the lever. This lever, turning on the hinge as a centre, actuates the chain, and shuts the door. This arrangement has the advantage of necessitating only one man to open and shut the door, and avoids accidents which might result to the labourers from the sudden falling of the door.

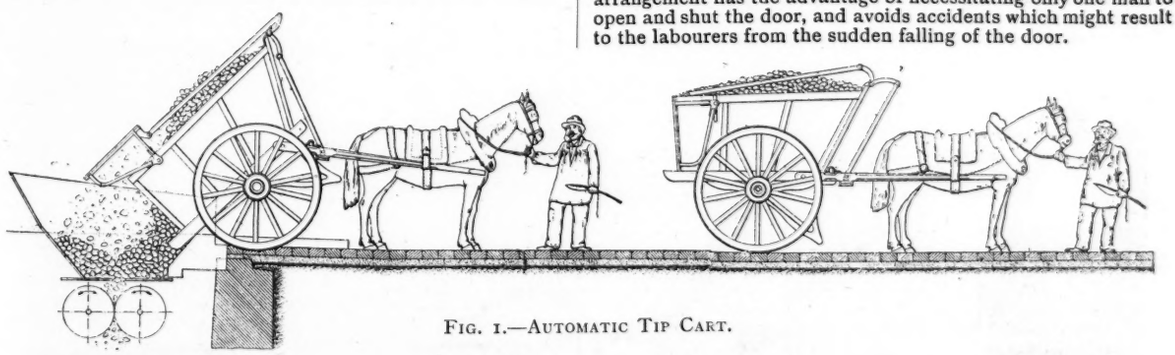


Fig. 1.—Automatic Tip Cart.

II.—*Automatic Tip-Cart* (see fig. 1).—The principle of the action of the tail-board consists in the fact that, during the movement of it, the shafts fastened to the horse undergo very slight displacement, while the body of the cart itself turns on the axle. It results from this, that the distance which separates the shafts from the middle of the front of the cart increases in sufficiently large proportion, while the cart passes from the travelling to the discharging position. The tail-board is fastened to the shafts by connecting-rods AB, DE; the bent lever BCD working from the point C (fig. 2). It is also joined to each side of the box of the cart by a wrought-iron arm turning on the point R. A is a fixed point of the shafts linked at O with the body of the cart. In the emptying position, the shafts make, with the bottom of the cart, an angle $AOA^1$ of about 53°; the dotted line CBA becomes $C B^1 A^1$, and the end D of the bent lever BCD becomes $D^1$. The connecting-rod DE and the tail-board turning on the point R become $D^1E^1$; and the bottom of the cart is thus left quite open. C is a fixed point of the box of the cart. During the righting of the cart, the rigidity of the connecting-rods compel the tail-board to return to its position; the weight

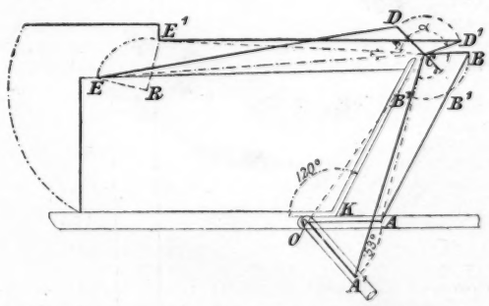



Fig. 2.—Automatic Tail-Board of Coke Cart.

of the board itself assisting. The wheels of the cart during the emptying are held in a groove of sufficient depth that the effort necessary to pull the cart out will be greater than that required

for righting it. Thus, when the horse draws the shafts, the cart begins by assuming its normal position, and afterwards leaves the groove.

III.—*Skips and Cranes for Filling Railway Waggons with Coke* (see fig. 3).—In some works of the Paris Gas Company (La Villette and La Landy), railway lines have been laid along the screening shed. The ground of the shed is raised to the level of the floor of the waggons, which is advantageous for loading with sacks. For filling waggons with coke in bulk, cranes and special

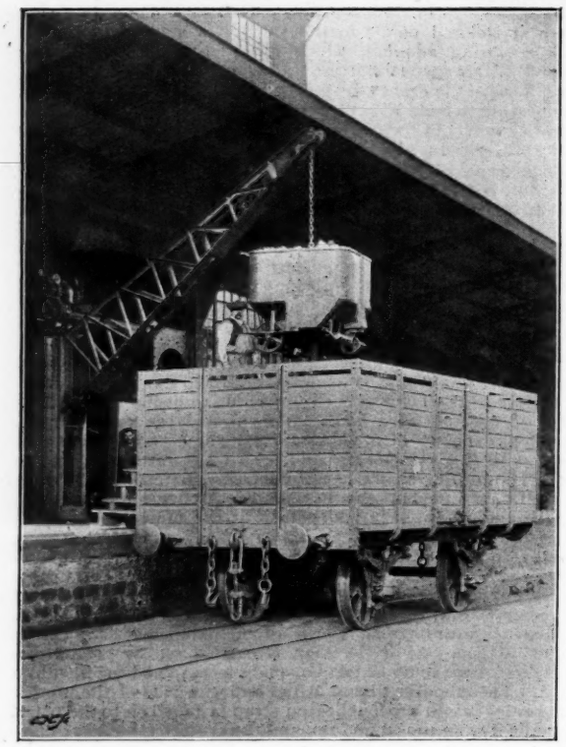


FIG. 3.—SKIP AND CRANE FOR FILLING RAILWAY WAGGONS.

skips are used. The cranes, on the Caillard system, consist of a vertical shaft supported by one of the roof pillars, and of a gib, the span of which allows of placing the skips in the centre of the waggons. The motive power is taken from the general driving-shaft of the screens; and the slowing down is obtained by means of a screw of sufficiently small thread, so that only under the action of the skip and of the coke is it able to be turned. A disconnection can thus be effected, and the skip stopped, at any point whatever in its lift, without fear of seeing it fall by its weight. The skips have a capacity of 10 hectolitres, and empty through the bottom. They are mounted on three wheels, two of which in the rear run on a fixed axle; the third in front being able to be turned in all directions. The contact-surface of the support of this roller with the skip is made up of a cast-iron ring, forming a circular groove filled in with balls. Owing to this arrangement, the guiding of the skip is easy, and only requires one man to attend to it. The weight of the empty skip is 340 kilos. (750 lbs.); and filled with 10 hectolitres of coke, about 740 kilos. (1633 lbs.). These skips open at the bottom on pulling a hand-lever. The doors are balanced.

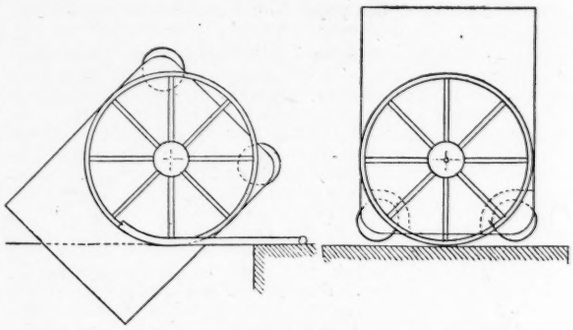
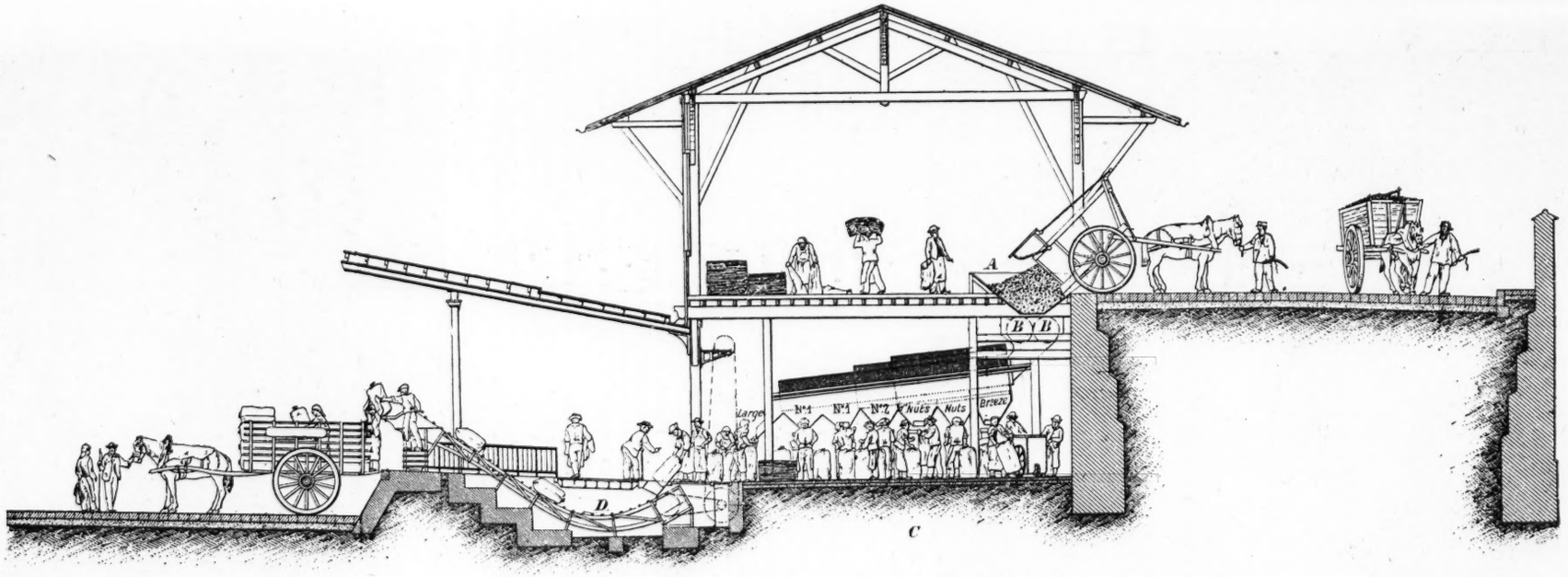


FIG. 4.—HAND TIPPING SKIP.

*Tipping Skip* (see fig. 4).—This skip, of rectangular shape, is carried on two large wheels 800 mm. (31·5 inches) in diameter, the axle of which is situated below the centre of gravity of the vessel when full of coke, and above it when the skip is empty. The full skip is thus in instable equilibrium; but on inclining it either to the front or back, it becomes supported on a roller placed centrally between the wheels, and thus forms a tricycle and travels in a steady way. To empty the skip, it is led above the openings where the coke is required; the large wheels run on to the U irons which guide them; and, the roller having lost its support, the skip is turned over by a push from the workman. The empty skip recovers itself; its centre of gravity being below the axle. The capacity of the skip is 430 litres. It is easily managed by one man.

IV.—*Transporters; Bucket Elevators for Coke in Bulk.*—The bucket elevators used in the coke-sheds of the Paris Gas Company are made up of buckets of sheet steel, 2·5 mm. thick. One of them is shown suspended by the crane in fig. 3. Their shape and capacity vary according to the power required, and the more or less winding route which they have to follow. The chain which connects them is a detachable link chain; the links being placed at the right of the buckets, and furnished with lugs to which they are bolted. On each side, the buckets have rollers which travel between two guiding angles, and which form

FIG. 5.—STACKING CONVEYOR.




A. Hopper. B. Breakers. C. Screens. D. Conveyor for Loading Carts.

FIG. 6.—PLANT FOR TIPPING, SCREENING, BAGGING, AND DESPATCHING COKE.

the framework also of the transporter. The angles (which are curved according to need) allow the buckets to follow a winding course, such as the situation may require. It is necessary, however, for the route of the buckets to be always in the same vertical plane. At the two ends, the chain passes over a sprocket wheel—one wheel mounted on the driving shaft, the other on a shaft carried by adjustable plummer-blocks, which allow of the chain stretching more or less by moving the shaft. In some cases, the shaft is also the driving one.

V.—*Stacking Coke:* (1) *Sack Conveyors for Carrying and Stacking.*—These conveyors, which are very much used in the coke-yards of the Paris Gas Company, enable sacks of coke to pass over long distances, and to be raised to the tops of heaps of 20 metres (65 feet) in height, without requiring any manual lifting. They are of different types, according to the purposes for which they are intended. They are made up of a conveying chain, furnished with push-plates, on to which the sacks are put, and of a fixed metal framework for supporting and guiding the chain. The speed of the chain varies between 30 and 40 centimetres (11·8 and 15·75 inches) per second.

*Horizontal Transporters.*—The horizontal transporters are generally placed along the walls. The carrying chain is put 1·20 metres (4 feet) above the ground; so that it can be easily loaded or unloaded at any point whatever along its course. By means of this apparatus, it is easy to carry the sacks from all the screens close to the plant for stacking, or for the carts or railway waggons. The length of these transporters may be very great. At Clichy, they are 65 metres (213 feet); at Villette, 80 metres (262 feet).

*Stacking Conveyor* (fig. 5).—The framework of the stacking conveyor is made up in the same way as the horizontal transporter; but it has, in addition, side foot-ways. It stands on metal piles firmly anchored in the ground, and hidden at times in the coke. These conveyors have an inclined portion starting from the platform of the screening sheds and ending at the top of the nearest heap. Some are continued horizontally, for supplying the tops of other heaps. Advantage is taken of the conveyor passing above the railway sidings for conveniently filling the waggons with sacks of coke, which slide down shoots into them. Apparatus of the same kind allows of passing the sacks underground, where the roads are obstructed by cart traffic, and carrying them directly to a suitable height for filling trucks. (See fig. 6.)

(2) *Rope Transporters* (fig. 7).—As well as these conveyors, the Paris Company use rope transporters for stacking coke. The endless metal rope is here both carrier and driver. It revolves at the two ends of the course on two grooved pulleys of large diameter on a vertical shaft. One of these is the driving pulley, and can also be adjusted in its own plane so as to vary, as desired, the tension of the rope. The cable, or rope, is supported at various points on horizontally placed rollers. The sacks are put into corbel-supports resting on the rope by means of leather-bushed chairs. These chairs, or cushions, are, in addition, furnished with two grooved rollers, which run to the two extremities of the course, and, where the rope winds round the end pulleys, up on to an angle pathway. This circular track, situate at the loading point, is long enough to accommodate a good number of corbel-supports. These, on being loaded, are pushed by hand up to where the leather fitted chair comes into contact with the rope, which then carries them away. The speed of the cable being only from 20 to 30 centimetres (7·87 to 11·81 inches) per second, two men placed on the coke heap itself can seize the sack as it passes, and empty it. The uncharged corbel-supports continue to be carried along by the cable up to the semi-circular track round the return pulley. This is fitted with fingers for carrying along the track the corbels which, having run a half-circumference concentric with the return pulley, come of themselves to ride on the return rope, and so are carried back to the loading point.

(3) *Mono-Rails* (fig. 8).—Mono-rails permit of an easy transport of sacks on to the coke heaps. They start from the top of the heaps, at the arrival points from the conveyors and

FIG. 7.—ROPE TRANSPORTERS.

elevators, and radiate from these centres, so as to carry the sacks right to the spot where they are emptied. The sacks carried by the conveyors are placed on corbel-supports, furnished with rollers, which run on the mono-rails. A slope of 10 to 20 mm. per metre is given to the departure mono-rail. All the corbels, or sack-carriers, are joined together by a small cord, so that those loaded, in coming down the slope, by their weight pull up the empty ones on the return mono-rail. The carrying of sacks by mono-rails is further adopted for running long distances, by hanging the rail from the walls of the coke-breaker buildings and stores. At the Clichy works, for example, the sacks, which are raised by a lift to the upper floor of the house, are placed on the corbel-supports of a mono-rail fixed to the wall of the building. The total length (going and returning) of this mono-rail is 390 metres (426 yards). It is worked entirely by gravity. The empty sack-carriers are raised to the loading point by an endless rope, furnished with claws, which lay hold of them automatically.

VI.—*Conveyor-Lifter-Drier* (fig. 9).—To satisfy the requirements of a certain number of consumers, it is necessary to diminish the quantity of water in the coke coming from the quenching yard. To do this, the Paris Gas Company have put up at the Clichy works drying apparatus of great power. It consists of a conveyor made up of a series of plates, fitting into one another, so as to form a continuous surface 1·80 m. (5 ft. 11 in.) wide and 66 m. (216 ft. 8 in.) long, circulating in a highly heated enclosure. Each perforated sheet-iron plate has two rollers travelling on rails. They are all connected to the links of two detachable endless chains. At the two ends of the travel, the chains pass round two wheels of the same diameter, and mounted on the same axle—driving the plates by their motion. The wet coke coming from the screen is thrown continuously on to the drying table by means of a chain of buckets. The coke, spread in layers of 10 to 20 centimetres (3·94 to 7·87 inches), is carried away by the table at a speed of 30 to 40 mm. (1·18 to 1·57 inches) per second; and, after a journey of 30 to 40 minutes in the highly-heated casing, falls through a sheet-iron shoot on to a bucket elevator, which, in turn, throws it into the railway waggons for delivery. The casing through which the table moves is made up of an iron framework, which serves to support the out-going and return run of the table, and which is provided over all its surface exposed to cooling with sheet-iron boxes full of sand, forming an isolating covering 130 mm. (5·12 inches) thick. The top, formed of sheets covered with 200 mm. (7·87 inches) of sand, supports at 50 mm. (1·97 inches) above the coke layer, a series of sheet-iron pipes, in which circulate the fumes from two heaters. Every seven metres (23 feet), the pipes open out into the rectangular boxes in which they lie, so as to allow of their expansion. The play left between the collars of the expansion boxes and the pipes, allows the steam set free by the coke to unite with the fumes, and be discharged with them into the air by the chimneys of the heating apparatus. The distribution of the heat ensures the gradual warming of the coke in the first third of its travel in the drier; in the second third, a very high temperature is kept up; and in the third part, it is gradually reduced to 100° C., at the coke-outlet. The motive power is obtained from a dynamo of 11,000 watts. The capacity of the conveyor is from 300 to 350 hectolitres of coke an hour. The apparatus not only has the advantage of drying, but also of conveying the coke. The elevators and conveyors work automatically; and the coke put into the hopper is dried and carried to the railway waggons, a distance of 80 metres (262 feet), without being touched by any workman.

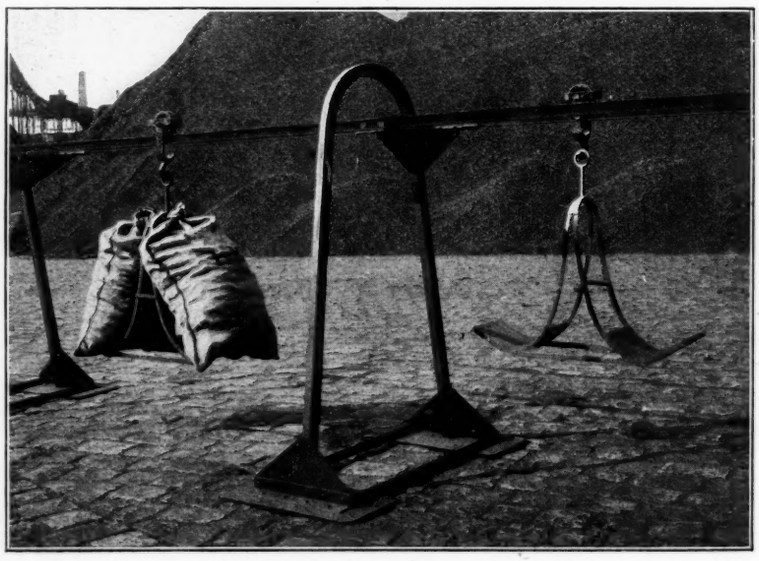


FIG. 8.—MONO-RAILS FOR TRANSPORTING SACKS.

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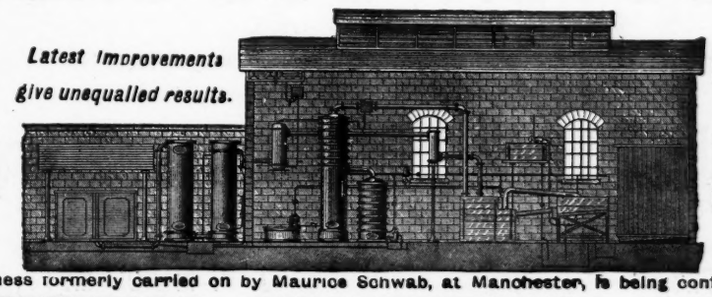

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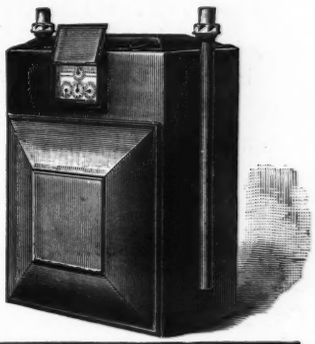

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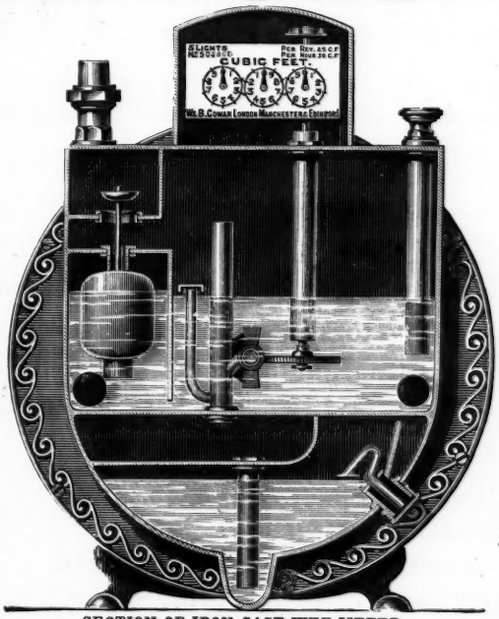


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SPENT LIME as carbonate is RESTORED at a cost considerably under that of New Lime, and that WITHOUT LIMIT to its DURABILITY, and with UNIMPAIRED EFFICACY as a Purifying Agent. The LIME is RESTORED on the PREMISES; ECONOMY of SPACE is SECURED by the non-accumulation of Spent Lime—thus SAVING all TROUBLE and EXPENSE in the disposal of the Lime as waste. The PROCESS can be USED in any LOCALITY without becoming a nuisance. Enquiries respectfully solicited. Full Particulars from Messrs. SAMUEL WHILE & SON, 60, Queen Victoria Street, LONDON, E.C.; or from the Principal Agent, R. F. HISLOP, F.C.S., Gas Engineer, Craigielea, PAISLEY.

# A NEEDFUL NOTICE

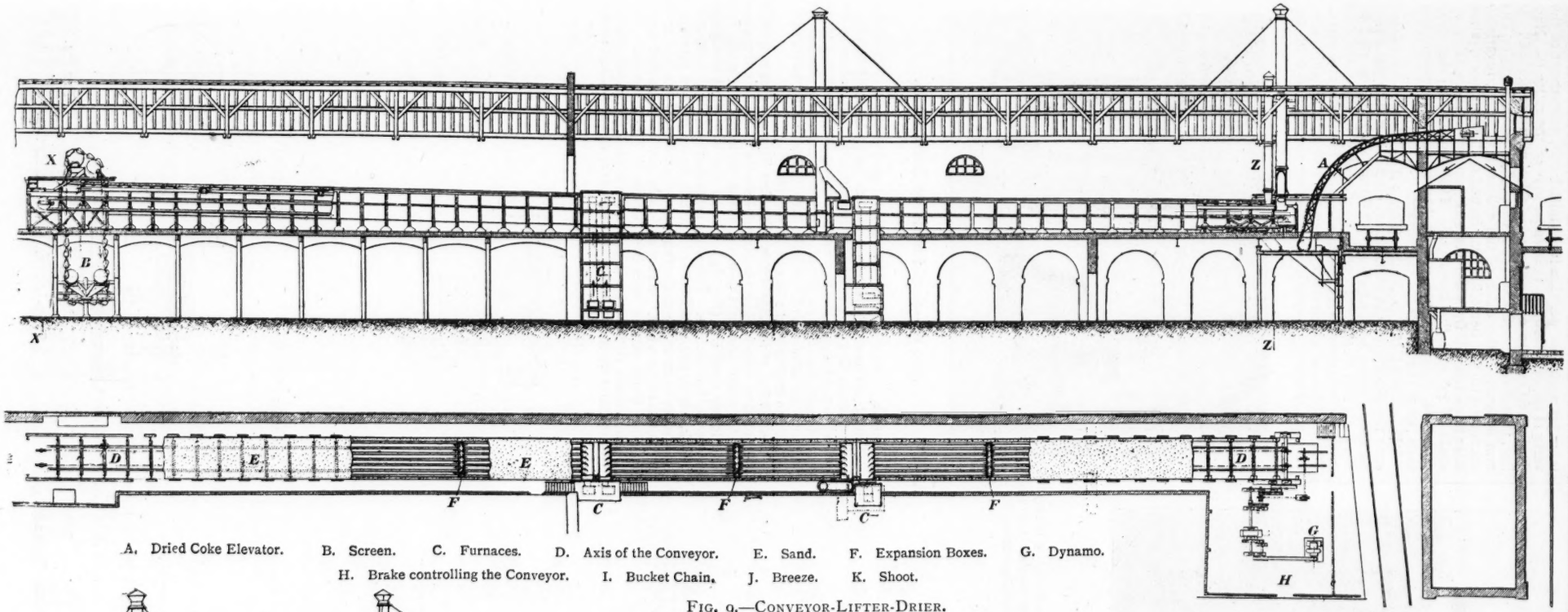
## TO ALL WHOM IT MAY CONCERN.

We hereby intimate to Chairmen and Members of Gas Committees, Engineers and Managers of Gas-Works, that we have **PURCHASED THE BUSINESS AND PATENTS OF THE AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED,** Westminster, London, and are now the Sole Owners of the Patents of the pre-eminently successful system of Self-Acting Conveyors and Elevators in combination with the Storage Hoppers, the Measuring Chambers, and the Charging-Shoots, forming together the much admired and happily-designated "powder-pouch" method of charging Inclined Retorts, now in operation, or in course of erection, at—

| | | | |
|---|---|---|---|
| **Aberdeen,** | **Cambridge,** | **Leeds,** | **Nine Elms,** |
| **Batley,** | **Chesterfield,** | **Leigh,** | **Rotherham,** |
| **Bow Common,** | **Coventry,** | **Manchester,** | **Smethwick,** |
| **Brentford,** | **Dewsbury,** | **Middlesbrough,** | **Todmorden,** |
| **Brighouse,** | **Dudley,** | **Middleton,** | **Wakefield,** |
| **Burnley,** | **Gateshead,** | **Nelson,** | **West Hartlepool,** |
| **Burslem** | **Huddersfield,** | **Newcastle,** | **Wolverhampton.** |

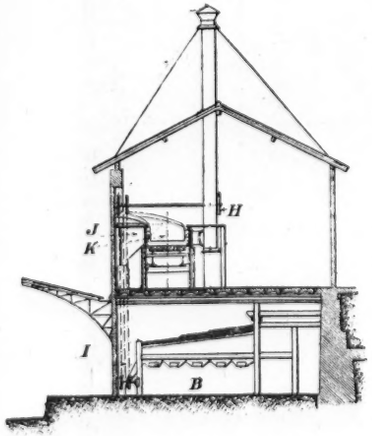
**PLEASE ADDRESS:**

# NEW CONVEYOR CO., LTD., SMETHWICK.

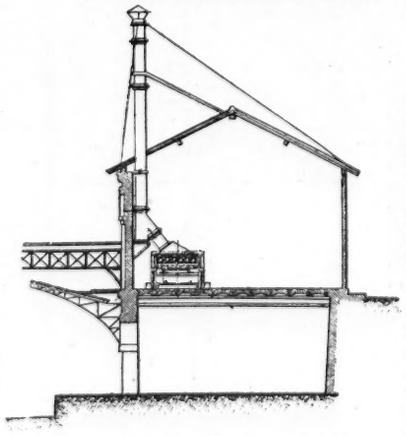



A. Dried Coke Elevator. B. Screen. C. Furnaces. D. Axis of the Conveyor. E. Sand. F. Expansion Boxes. G. Dynamo.
H. Brake controlling the Conveyor. I. Bucket Chain. J. Breeze. K. Shoot.

FIG. 9.—CONVEYOR-LIFTER-DRIER.




SECTION ON THE LINE X X.



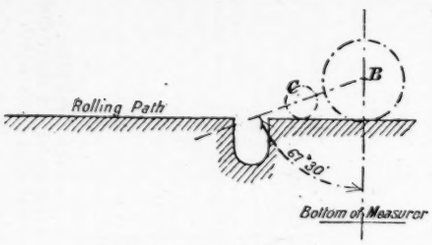
SECTION ON THE LINE Z Z.

VII.—*Hectolitre-Charger* (fig. 10).—This apparatus is used in the yards of the Paris Gas Company for measuring and putting the coke into sacks. The small total height of the apparatus (1·25 metres, or 49 inches) allows of the placing of the hectolitre-charger under the shoots of the screens. The arrangement is such, however, that sacks 80 centimetres (31·5 inches) high can be filled, and that without almost any effort on the part of the workman, who very easily manages the measurer with only one hand. The sheet-iron hectolitre measurer is cylindrical, and it carries, fixed at diametrically opposite generating-lines (fig. 11), two arms, making an angle of 67° 30′ with the generatrices of the cylinder, and each provided with two rollers B and C. The bearing rollers B run on two rails all but horizontal; the rollers C, of much smaller diameter, run on the same rails, which, at two-thirds of the course, are separated by a short distance—thus forming a prime of two vertical slides into which the rollers C drop. By continuing the advance of the hectolitre-charger, the rollers C go down into the vertical slides, giving to the measurer, through the supporting arms of the axles, a tipping movement on the centre line of the rollers B. These, owing to their large diameter, are not able to fall into the vertical slide. They run, moreover, on a rail at the right side of the opening.

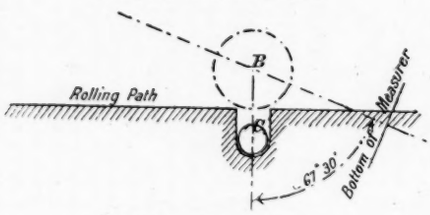
The hectolitre-charger is put into action either by means of a hand-lever, or by a treadle and lever arrangement. Directly the hand-lever or treadle ceases to be worked, the weight of the measurer itself returns it to its position for filling. So that the hectolitre-charger may completely empty itself, it is necessary that the generating-lines of the cylinder take an angle of 45° to the horizontal. The angle to which it is necessary to turn the measurer on the centre line of the roller B is therefore $90° + 45° = 135°$. This turning is done in two equal divisions of $\frac{135°}{2} = 67° 30'$ each. For this reason the radii of the rollers are in relation, so that the angle of the line B C, which joins their centre with the generatrices of the hectolitre, is equal to 67° 30′. (See the position of the hectolitre when filling.) During the first phase of the turning, the roller C goes down into the vertical groove until the roller B finds itself standing perpendicular to this groove. At this moment the line B C is vertical. The angle which it has covered is, therefore, 67° 30′. (See the

FIG. 10.—HECTOLITRE CHARGER.

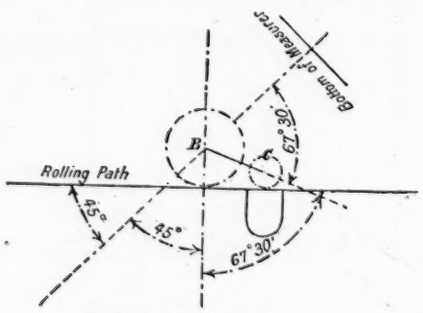
intermediate position.) During the second phase of the movement, the roller B continuing to advance along the horizontal rail, the roller C rises in the vertical slide, and finally comes to



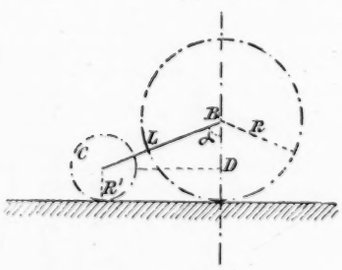

POSITION WHEN FILLING.




INTERMEDIATE POSITION.




POSITION WHEN EMPTYING.




CALCULATION OF RADII.

FIG. 11.—DIAGRAMS OF WORKING OF HECTOLITRE CHARGER.

take up a similar position to its initial one, on account of the vertical passing through the centre line of the roller B. Now the line B C makes a new angle of 67° 30′ with the vertical. It has, therefore, turned a total of twice 67° 30′—that is 135°. The arm support of the axles of the rollers B C, being invariably connected to the hectolitre, has turned 135°, and its generating lines have passed from the vertical position to one making an angle of 45° with the horizontal. This apparatus being quite moveable, it may be taken from one screen to another, and even put at the foot of the coke heaps.

VIII.—*Sack-Lifter to Back.* (Fig. 12) —These lifts, placed near the screens or the sack-stores, enable a man to put a sack on his own back without effort. Different systems are used by the Paris Gas Company; but they differ only in the method of driving—from the shaft of the coke-breaker to the elevator plates. These plates, of which there are two or four to each apparatus, have an alternate movement from bottom to top and from top

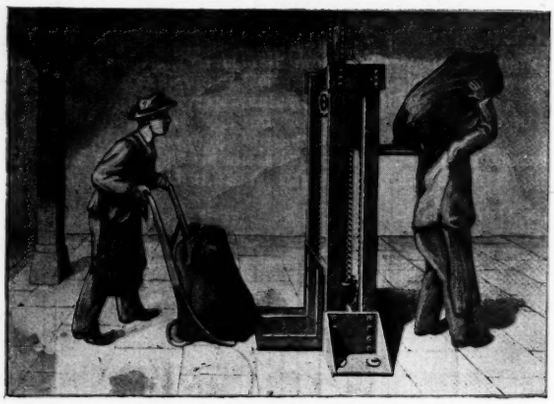


FIG. 12.—SACK-LIFTER TO BACK LEVEL.

to bottom. This raises the horizontal part of the tray from the ground level to a height of 1·40 metres (55·15 inches), and then returns from this height to the ground level. A pause in the travel of the tray, at the two ends of its stroke, allows the workman to put the sack on the plate when it is at the ground level; and, on the other hand, to tip the sack and take it on to his back, when the tray is at the top of its stroke.

*Description of the Apparatus with Two Trays.*—The motion is obtained by means of two horizontal shafts placed in the same vertical plane—one at the top A of the sack-lifter, the other at the lower part B. (Fig. 13.) On to the top shaft are keyed three toothed wheels. The shaft is carried by a single plummer-block, which can be adjusted vertically by means of a screw and nut, so as to increase or decrease the distance of the top shaft from the bottom one. The middle wheel C is connected to the driving shaft of the coke-breaker by a Ewart chain. The bottom shaft B, held by a single fixed plummer-block, carries two toothed wheels of the same diameter, and opposite the out-

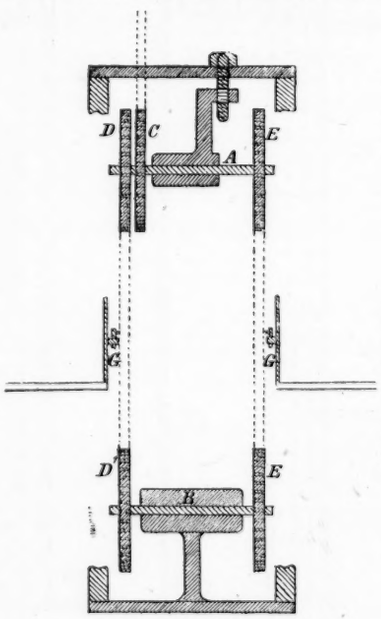



FIG. 13.

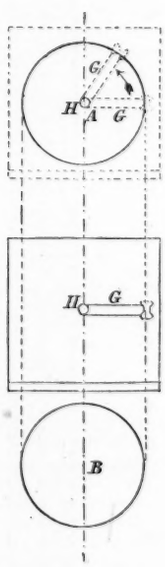



FIG. 14.

SACK-LIFTER TO BACK LEVEL.

side wheels of the top shaft D D′ E E′. On each of these pairs of wheels runs an endless Ewart chain; and each chain works a tray by means of a crank G, connected at one end to one of the chain links, and at the other to a pin H fixed in the centre of the vertical part of the tray or plate. The crank is the length of the inside radius of the toothed wheels. As long as the link fastened to the crank moves vertically—covering the space which separates the two shafts—the crank remains horizontal (the chain being stretched), and starts the ascending or descending tray. From the moment when the link reaches the toothed wheel, the crank-pin, fixed to the tray, finds itself at the height of the centre of the wheel, and the crank becomes a radius of the wheel, and describes (being carried on by the chain) the upper half-circum-

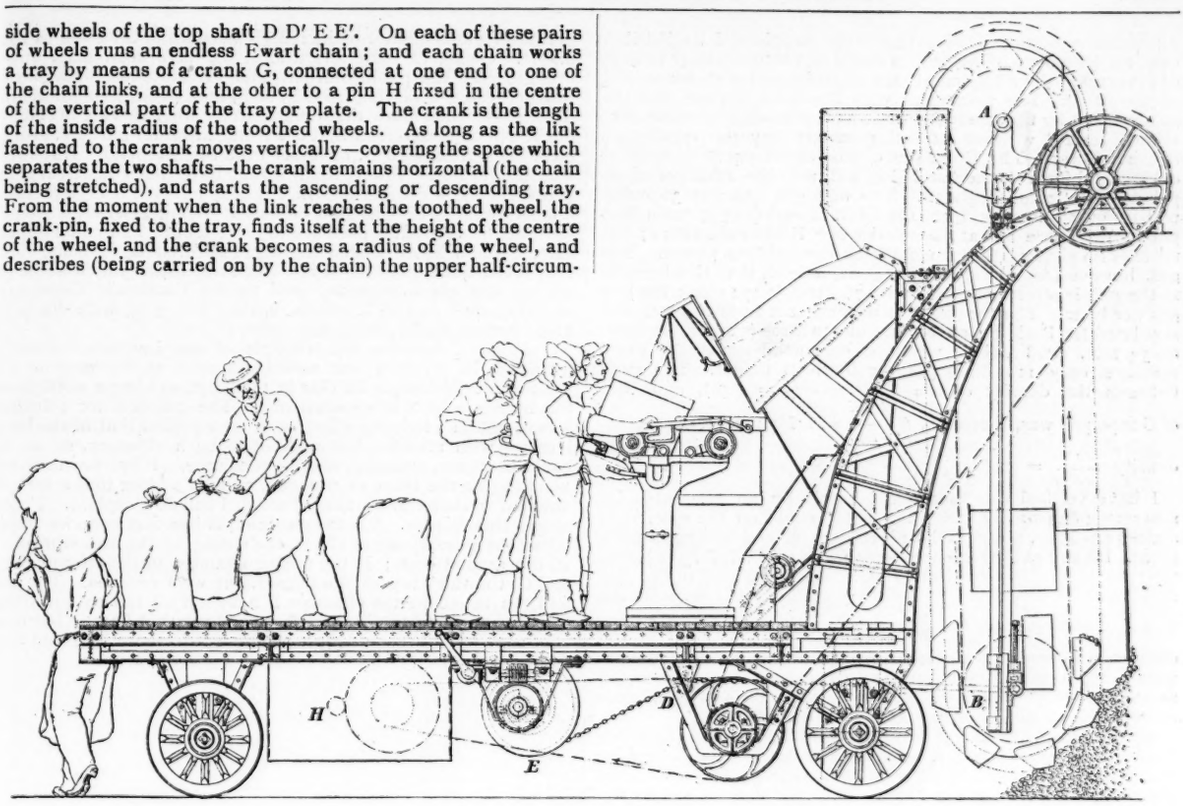



FIG. 15.—PORTABLE ELEVATOR FOR TAKING COKE FROM THE HEAP.

ference of the top wheel or the lower half-circumference of the bottom one. (Fig. 14) The pin fixed to the tray remains at the height of the centre of the wheel during this half-revolution; and the tray remains still during the corresponding time. These stops in the moving of the trays are utilized, at the bottom for placing the sack on the plate, and at the top for taking hold of it and putting it on the back. Irons of ⊔ section, which form the framework of the elevator, are used as guides, and as the track for the four small cast-iron rollers fastened to the trays.

IX.—*Portable Elevator for taking Coke from the Heap* (fig. 15).—The arrangement for taking the coke from the heap consists of a chain of buckets, mounted on a swinging metal arm A B. This arm is moveable about a horizontal axle C, arranged so that the weight of it always tends to push into the coke heap the lower part of the elevator or drag. The depth at which the buckets go into the heap is regulated by a counter chain B D E, which winds itself round a common windlass E. The shaft B, which carries the lower wheels of the elevator chain, is mounted on adjustable plummer-blocks, which allow of regulating at will the tension of the chains. The coke, raised by the buckets up to the top of the elevator, is thrown into a hopper, the sides of which act as sifters. The dust slides by side shoots into baskets or sacks placed on the ground. The clean coke is put into sacks by means of three hectolitre-chargers of the type already described. The motive power is supplied by an electrical motor H of 3500 watts; and the driving is done by belting, and by a detachable Ewart chain from the top part of the elevator or drag. The electric current, given by a generating dynamo in the machine-room of the coke-breakers, is carried by isolated cables, passing above the heap to the elevator. Receiving boxes for the current, placed at different points in the yard, allow of reducing to a minimum the length of the moveable cables required. The whole apparatus, with its sorting hopper, the three hectolitre-chargers, the driving dynamo, the speed reducers, and the common windlass, is mounted on a moving platform, which is used as a loading dock; so that it all may be easily removed from one heap to another by two horses. The total weight on wheels is 6000 kilos. (5 tons 18 cwt.). The capacity of the plant varies from 350 to 450 hectolitres per hour, according to the kind of coke put into the sacks.

X.—*Machines and Different Apparatus.*—Continual use is made by the Paris Gas Company of various other machines and apparatus for the mechanical conveying of coke and coal. Mechanisms like those used in all industries where heavy loads have to be carried, and not applying specially to coke and coal, need only be mentioned without describing them. Electric capstans allow, by means of cables and headstocks placed at fixed points, of easily and quickly moving waggons on railway sidings, at the right of the loading apparatus. They do away with the often dangerous use of horses on the congested roads of coke-yards. In short, thanks to these means, the working of waggons and locomotives on turn-tables is made much more rapid. Elevators, hoists, and lifts of various types, serve to raise coke sacks or skips to the different floors of buildings. They are driven either by steam, gas, or electricity, according to the special conditions which present themselves at the time of their construction. The use of portable railways is very efficient and very economical for making or removing coal and coke heaps. The rails used by the Paris Gas Company are, preferably for portable ways, double-headed, 6 metres long (19 ft. 8 in.), weighing 35 kilos. per metre, and mounted on oak sleepers by means of cast-iron chairs and steel wedges. At the Boulogne Gas-Works, which receive coal by water, and which are not connected with any of the great Railway Companies' systems, the transport is done by Decauville lines. The lines are fixed, and there are guard-rails where they are passed over by carts. They are, however, moveable to the site of the heaps. The small waggons may be tipped on the side, and the hauling is done by horses.

*General Remarks.*—All the plant has been designed and carried out according to the instructions given by M. Léon Bertrand, the Engineer attached to the office of the Company, by the works department of the Paris Gas Company, under the direction of M. Louvel, the Chief Engineer of this work, assisted by M. Béguin, the Assistant-Engineer. They have been especially helped in their efforts by M. Helmer, the Inspector of the boiler workshops, and MM. Trouvé and Hosselet, the chief agents of the coke-yards at Clichy and La Villette.

## NOTES ON THE PUBLIC LIGHTING OF THE TOWN OF GUAYAQUIL.

By M. CHARLES GUICHARD, of Paris.

**[A Paper read before the International Gas Congress in Paris.]**

This paper might have as a sub-title: "Defensive Means to be Used against Nocturnal Insects;" for, in the course of it, the author will often be obliged to refer to beetles, moths, and mosquitoes—those imprudent friends of the light, which are quite as dangerous to incandescent mantles as the natural enemies, wind, torrential rains, and even earthquakes. It may be said that, apart from the initial difficulties of introducing gas, there were others to be overcome; and it was thought that a description of the means and apparatus adopted might give useful information to those who may have to do similar work in such countries, and might suitably supplement papers already read on companion subjects at previous meetings.

Guayaquil is a town of 70,000 inhabitants, and the most important in the Republic of Ecuador. It is situated at the foot of the Andes, on a very flat peninsula, formed by the alluvia of the Rio Guayas—a very rapid river, having a width of 1876 metres (about 2050 yards). It is by this river, also, the depth of which at low water is 15 metres (nearly 50 feet), that the works are supplied with coal.

Before speaking of the public lighting itself, the author thinks

it necessary to say a word as to the gas supply and its distribution, as the nature of these two important things was the cause of preventing the adoption of incandescent gas before his arrival at the works. The agreement with the town specifies that the gas sent out by the Company must be the product of "the best known coals," without indicating in any way the quality or lighting power. The Company carbonize an equal mixture of caking coal from Canada and England, with the addition of 20 per cent. of Scotch boghead. The make of gas was 30 cubic metres, on an average, from 100 kilos. of coal (10,765 cubic feet per ton). There are at the works two Beale exhausters; but there is no photometer for measuring the lighting power. The gas, however, is very good—so good, indeed, that the burners in the public streets consume only 70 litres (2·472 cubic feet) of gas per hour. The regenerative burners sent from France, and regulated for Paris gas at the rate of 150 litres (5·297 cubic feet), at 30 mm. (1·18 inches) pressure, consumed under the same pressure only 110 litres (3·885 cubic feet) of gas. The ratio between the density of the Paris gas ($\delta = 0{\cdot}40$), and that of Guayaquil was, therefore, $\sqrt{\frac{110}{150}} = 0{\cdot}857$; and the actual density $\frac{0{\cdot}40}{0{\cdot}857} = 0{\cdot}461$.

I have verified this theoretical result by an apparatus for measuring densities, which was roughly made on the spot, with a glass chimney, a tap, and a nickel cap, pierced by a fine needle point. I found at the same temperature of 26° C. (79° Fahr.), that the time of air-flow was 3 minutes 21 seconds; and of the gas, 2 minutes 18 seconds. If these are reduced to seconds, the density compared with the air becomes $\delta = \left(\frac{138}{201}\right)^2 = 0{\cdot}472$. The difference between the actual result and the calculated one, which only comes about from the figure taken as that of the average density of Paris gas, shows the sufficiently practical correctness of similar experiments and calculations.

All the lighting, both public and private, was done by batswing burners. I have not found in the whole town a single argand burner; and, in fact, besides the batswings, there were only three regenerative—one "Industriel," and two "Cromartie" lamps of 150 litres (5·297 cubic feet). I therefore used a batswing burner to find out the lighting power of the gas—taking as a standard the stearine candle. I made a photometer according to Rumfort's method, and as a standard of comparison used two candles of six to the pound, placed in a plane parallel to the photometer, and spaced 5 centimetres (1·969 inches) from centre to centre of the wicks. Taking these candles as worth one-eighth of a carcel, I corrected their lighting power as their weight reached or passed 10 grammes per candle per hour. I ought to add that these tests were made with noted temperatures, varying from 28° to 35° C. (82° to 95° Fahr.); these being the local temperatures at which the gas is used. A No. 28 Bray burner, consuming 200 litres (7·063 cubic feet), gave a result of 23 candles, or 2·89 carcels, and the carcel-hour for $\frac{200}{2\,89} = 69{\cdot}21$. The street burners with our gas correspond to those consuming 130 litres (4·591 cubic feet). The gas is sold at 20 centavos, or 1 fr. per cubic metre (22s. 7¾d. per 1000 cubic feet).

Finally, I must certainly say a word or two about the manufacture and distribution of the gas, so as to complete the list of difficulties that may be met with in a similar situation. After leaving the hydraulic main, the gas is but inefficiently condensed. There is no mechanical tar extractor; and it will be understood that an ordinary pipe condenser, without a water spray, and with a temperature as high as 60° C. (140° Fahr.) in the sun, does not produce effective condensation. The real cooling takes place in the scrubbers. The adequacy of such condensation may well be doubted, when it is stated that I have found fairly liquid tar in the pipes and syphons, 2 kilometres (1¼ miles) away from the works. That naphthalene, however, is not met with, and indeed is unknown in the country, may be explained by remembering the average temperature is 29·6° C. (85° Fahr.).

The distributing main is in the form of a girdle—the pipes being 500 mm. (19·69 inches) in diameter; and the street mains are fed from trunk-mains of suitable size. Unfortunately, the ground is so bad—water being found at 70 or 80 centimetres (27·56 or 31·5 inches) underneath the roadway—that the pipes are laid almost on the ground level. They were put down without sloping, and with an insufficient number of syphons; so that in the course of our work of equalizing the pressure, we found 6-inch pipes half full of tar. In other places, 4-inch Chameroy pipes were completely eaten away, and the gas passed along the channel made in the hard clay by the pipe, the comparative tightness of which was due to the tar covering its sides. I may add that, on an average, six or seven times every year the mains are shaken by earthquakes, lasting about 20 seconds, which gave one an opportunity of seeing how the anti-vibrators on the burners acted. The earthquakes are an undulation of the earth, which may be well compared to the shuddering of the skin of a horse or an ox, when it wants to get rid of annoying insects. Of course, all the houses are of wood or iron; but it is very surprising that these earthquakes affect the mains, comparatively speaking, so little. After three which occurred during the months of December, January, and February, we had only to open one trench to repair a cracked pipe.

The gas always leaves the works under 35 mm. (1·378 inches) pressure, which cannot be increased because of the state of the mains. Owing to some alterations, we have been able, however, to give the public burners and private consumers in the town a pressure varying from 25 to 15 mm. (0·984 to 0·591 inch). This pressure is more than sufficient for the batswing burners; but it will be understood that the American Auer burners, which have been tried with it, have not been so successful. Not only was the pressure lower than would have been necessary to satisfactorily work burners in France, but the gas was also almost twice as rich as that of Paris. Being heavier, it would have required greater pressure to drive it out; and being richer also, it would have needed more pressure so as to bring into play a sufficient quantity of air. The apparatus which we have put up, and which is to-day used by the Alumbrado Company of Guayaquil, is the Lecomte burner No. 3 R, with bunsen, anti-vibrator, and lighting tap—type D B C.

I shall not describe the principle of the Lecomte bunsen,* for which its inventor was awarded a prize at the meeting of the Société Technique du Gaz in 1898, but will say a word as to the burner, which is a special one. The problem for solution was to obtain a lighting effect at least equal to that of the best burners with mantles, but without using a chimney, so as to avoid breakage, cleaning, and maintenance. It has been solved by changing the form of the cap, and by adding to it a sort of notched washer, the working of which I will now explain. Fig. 1 shows this burner. A is the gas-inlet, B the first cone for regulating the primary air at C; D, the spring of the anti-vibrator; E, the second cone; F, the mixing chamber of the air and gas; and G, the thick top of the burner, cut with notches. The air and gas mixed in the chamber F have not all the carburetting qualities required to obtain a short and very hot flame; but it is very easy to add them. Most people will have noticed that if a

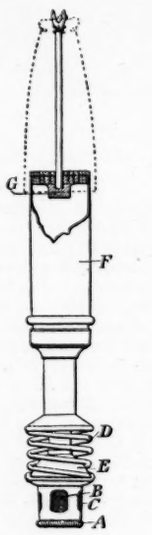



FIG. 1.

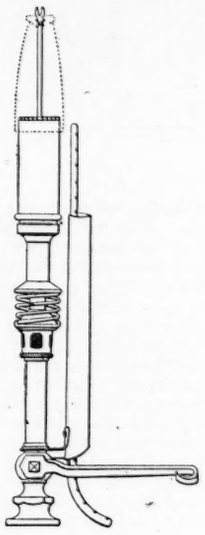


FIG. 2.

burner heats itself after a certain time of lighting, the flame is shortened, the burner hums, and then finally fires-back, which proves that the combustion mixture is very active. Well, it is this that M. Lecomte has taken advantage of in his burner. The mixture of air and gas heats itself in passing through the slots in the metal top; and, in issuing, it burns with rapidity, without requiring supplementary air, and consequently without the need of a glass chimney.

The installation at Guayaquil numbered 1900 single burners, as shown complete in fig. 2, and 100 triple burners on the same system for the street lighting. I have recorded the consumption and power of the Lecomte burner (No. 3 R) by means of the Rumfort photometer, previously described, and have obtained the results shown in the following table:—

| Pressure in Millimetres. | Consumption in Litres. | Candles. | Carcels. | Consumption per Carcel-Hour. |
|---|---|---|---|---|
| 10 | 65 | 28·8 | 3·6 | 18·0 |
| 15 | 80 | 56·0 | 7·0 | 11·4 |
| 20 | 92 | 75·0 | 9 4 | 9·8 |
| 25 | 103 | 88·7 | 11·1 | 9·3 |
| 30 | 112 | 101·0 | 12·6 | 8·9 |

It will be noticed that the best results start from the pressure of 20 mm. (0·787 inch). The mantles used were made by the Alumbrado of Guayaquil, who manufactured everything complete. These conclusive results agree with those which were given by our colleagues of the Primitiva Gas-Works of Buenos Ayres, where the following figures have been obtained with the

* See "JOURNAL," Vol. LXXII., pp. 368, 535, 1472.

same Lecomte burner (No. 3 R). The gas at Buenos Ayres is rather lighter and less rich than ours.

| Pressure in Millimetres. | Consumption in Litres. | Distances in Metres. | Carcels. | Consumption per Carcel-Hour. |
|---|---|---|---|---|
| 11½ | 80 | 1·020 | 4·25 | 18·0 |
| 15 | 98 | 1·285 | 7·75 | 12·6 |
| 19 | 110 | 1·600 | 10·25 | 10·7 |
| 23 | 122 | 1·750 | 12·25 | 9·9 |
| 26 | 128 | 1·920 | 14·75 | 8·7 |

The tests are typical ones, because they have been carried out by the French photometrical method, with the Foucault photometer and the carcel lamp. One of the requirements (which was especially important to the Alumbrado of Guayaquil) was the power to place the burners directly in the lamps without altering them in any way. These lamps are shown in fig. 3, and are for the most part made of cast iron, with panes of glass both top and bottom. Acting on the advice of the inventor of the burner, I thought that it would be sufficient to close the lamp all but completely, so as to let the air required for combustion pass through, but not the wind. He, however, failed to take into account a much more serious inconvenience—namely, that of the nocturnal insects, which grow in these parts to quite formidable sizes. The day after putting up the first 60 lamps, 50 mantles were broken; and we picked out of the lamps fairly large insects—such as beetles, moths, locusts, &c. The beetle weighs about 60 grammes, and flies very swiftly, easily covering when fully on the wing 10 metres (32 ft. 10 in.) a second. I may

FIG. 3.

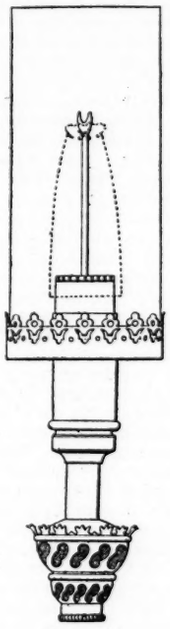


FIG. 4.

be excused from making the calculation of the net force of a coleopter; but it may be interesting to know that the practical result is, in many cases, sufficient to break the glass of the lamps. Other insects get in by the outlet-holes for the hot air. In fact, one-tenth of a litre of gnats is sometimes found in the lamps, but how they get in nobody knows.

In the design of the lamp shown in fig. 3 there is a detail introduced for the first time. The forged cross-bar which supports the lamp is formed of four branches, the upper ends of which are riveted to the lower part of the lamp-frame. At the bottom end, these four branches are joined together by two riveted rings. With this arrangement, all that is required is to drive down the cross-bar of the lamp on to the wooden top of the lamp-post, and the whole is then held firmly by iron or wooden wedges placed inside the rings. I do not quote this arrangement as a model of elegance, but as being very practical in a country where one cannot have everything instantly at hand, and where the fitting-up is done by natives, chiefly Indians.

To protect the burners in the houses, we have to provide them with a tulip-shaped glass or (preferably) with a globe, firmly held by claws, owing to the earthquakes, which are indeed, as I have said, so frequent that the inhabitants of these volcanic countries do not trouble themselves much about them. The chimney shown in fig. 4, which is 7 centimetres (2·756 inches) diameter and 16 centimetres (6·3 inches) high, is not intended to increase the draught of the burner, of which there is no need, but to provide the mantle with some protection from the direct attacks of insects and moths. The street-lamps have to be hermetically shut at top, because of "aguacerres"—a kind of diluvial rain of great violence, which always comes at nightfall for an hour or two continuously. To light the burners, the lamplighters use a rod on which is a petroleum spirit lamp with a wick 10 mm. (0·394 inch) diameter. This system is an excellent one for the country, as whatever be the wind, there is no failure in lighting. The Lecomte burners are as quickly lighted as the old batswings—for example, one man lights 150 lamps on the Malécom in 40 minutes, a total distance of 3 kilometres (1⅞ miles). Speed in lighting up is a necessity in these Equatorial countries, where there is hardly any twilight, and where night closes in within fifteen minutes.

The training of squads of lamplighters and lamp-cleaners was soon accomplished, though there were at first some faults to be overcome. For instance, there was the unfortunate habit which the Indians charged with cleaning the lamps had, of bodily grasping the mantles, and thus destroying them. The greatest praise that I can give the Lecomte burner, however, is to say that our staff, which is all but entirely made up of Indians ("Cañaris"), fix the burners, look after them, and light them, and that, in spite of all the elements of destruction that have been enumerated, the breakage seems to stop at 18 mantles per burner per year, everything included—wind, insects, moths, torrential rains, and earthquakes.

The lighting of the town has increased tenfold, and a like increase in private lighting has taken place. The distance between the lamp-posts on the Malécom (the quay of the Rio Guayas) is 40 metres (131 ft. 3 in.), the height of the light above the ground is 3 metres (9 ft. 10 in.), and the burners have the power of 10 carcels. The formula given by M. Ed. Servier, in his paper of 1882, on "Different Methods of Street Lighting," enables a calculation to be made of the amount of light received by a point at a given distance from the focus. Inversely, the lighting power of this point may be considered as a source of light. Taking—

$m$ as the lighting power of the burner = 10 carcels.
$y$ as the height of the lamp . . . . = 3 metres.
$x$ as the horizontal distance from the point $m$ to the foot of the lamp-post . . . . . = 20 ,,
and P as the amount of the light received by the point $m$.

Then—

$$P = \frac{2\,my}{(x^2+y^2)\sqrt{x^2+y^2}} = \frac{2 \times 10 \times 3}{(20^2+3^2) \times \sqrt{20^2+3^2}} = 0{\cdot}0072 \text{ carcel.}$$

M. Servier quotes in his paper 0·006 carcel as the maximum type of street lighting. It is further to be noted that this figure of 0·0072 carcel corresponds to the light normally received by an object placed at 1 metre (3 ft. 3·4 in.) from a focus of half-a-candle, or one-twentieth of a carcel. The lamp-posts being very far apart, the street lighting could be cheaply increased by heightening the posts and adding reflectors to the lamps. In the Séminario Park, the lamp-posts are placed 10 metres (32 ft. 10 in.) from one another; and the height of the burner is 3·50 metres (11 ft. 5·69 in) above the ground. The lights are in triplet, burning 270 litres (9·535 cubic feet) for the three burners, and producing a light of 30 carcels. The light received between the two lamps at the minimum point is 0·290 carcel, which is also the amount of light in the Place Rocafuerte. Throughout the rest of the town, the lighting varies between the two figures of 0·0072 and 0·290 carcel, according to the situation and the number of the lamps.

As regards the wear and tear of the mantles, taking as a basis the three worst months of the year, December, January, and February, it may be reckoned that 18 are used per burner per year. As already stated, the mantles are made at the gas-works. The net cost of the 18 is 9 frs. The burners, in 4015 working hours per year, consume 361 cubic metres (12,743 cubic feet) of gas, which at 50 c. amounts to 180·50 frs. The expense of the mantles, therefore, comes out at 5 per cent. of the cost of the gas. It will be seen that the maintenance of the mantles, in spite of the large number used, represents an insignificant figure compared with the cost of the gas. It would not be altogether the same here in France, as the gas is sold at a much lower price to the Municipalities.

In conclusion, the Lecomte burner that we have adopted, as well as the system of lighting up, gives full satisfaction as regards public lighting, and that notwithstanding the altogether unfavourable circumstances above described. It acts well with a very rich gas, and at a very low pressure; it is strong, easily regulated, and is the only one that has been able to work at Guayaquil.

I thought that the absolutely new conditions under which this installation of public lighting had been carried out would interest my colleagues, and would indicate a good solution in similar cases.

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**The Kitson High-Power Incandescent Oil Lamp.**—In the article on this subject in the last issue of the "JOURNAL," it is stated that in tests made at the laboratory of the Paris Municipality, with a consumption of 400 grammes of oil per hour, each burner gave 10·36 carcels. This was an error; the illuminating power, with a consumption of 400 grammes, being 96·4 carcels. A more recent test gives 100 carcels, with a consumption of 398 grammes of oil. The mistake, it is only fair to mention, occurred in the type-written figures supplied to us.

# NOTES.

### Artificial Daylight.

At the recent British Association meeting in Bradford, Messrs. A. Dufton and Walter Gardner submitted a paper, and offered a demonstration, upon the production of artificial light of the same character as daylight. The object of the authors was to produce a light by means of which colourists and matchers of tinted materials may work by night as well as by day. They exhibited a collection of dyed cloths illustrating the extent to which the appearance of some colours varies with the kind of light in which they are seen. Among these patterns, one which is green by daylight became red-brown by gaslight; a violet became purple; a grey became heliotrope; a shade of tan turned a brick-red. Particularly striking was a pattern woven from specially dyed yarns, which appeared a uniform green by daylight, but was figured in gaslight. Generally speaking, the colours became uglier by ordinary artificial light, including that of the electric arc. Colours that alter at all become redder under artificial light, which is due, not merely to the redder tone of the light itself, but also to the peculiar transparency of colouring matters for red light. This transparency is of primary importance in colour matching. The whitest artificial light contains too much red. It can, however, be corrected by means of a screen of cupric salts. For practical purposes, the correction is made by means of pale blue glasses coloured with copper, and answering the purpose of the ordinary glass globe.

### The Preservative Virtue of Creosote.

Mr. Hall has reported, in the "Analyst," on some instructive and simple experiments designed to test the preservative action of creosote and coal tar, and to ascertain to what constituents of the compounds this virtue is due. Lengths of good hemp string of known breaking stress were soaked in various extracts from creosote, and other pure materials, at water-bath temperature. The string was then partly buried for two months in garden mould, dug up, and its strength redetermined. The results obtained gave a low value to the phenoloid constituents, and not much more to the naphthalene; but the less volatile fractions of the creosote, the basic constituents, and bone oil which is rich in similar bases, all preserved the string fairly well. Small deal rods, 8 inches long by $\frac{3}{8}$ inch square, were also soaked in the various tar oils for $1\frac{1}{2}$ hours, at a temperature of 90° C., then buried to about three-quarters of their length in garden soil, taken up after about ten months, washed, slowly dried, and the transverse breaking strength measured. The results showed that the creosote itself, and especially the less volatile fractions, had considerable preservative power; the phenoloid and basic constituents had a real but smaller preservative power; but pure cresol had little or none. The general indication seems to be that the preservative action of coal-tar creosote lies in its property of filling the cells of the wood with a fixed moisture-resisting substance, rather than in any chemical antiseptic action. It is regarded as desirable, in the commercial valuation of creosote, to estimate the pyridine "tar bases," and to rate them as of equal preservative value to the "tar acids." This explanation of the nature of the preservative action of creosote on wood is not altogether a surprise.

### The Selection of Fire Hose.

One of the minor, but still important, cares of works managers is the provision and preservation of fire hoses. Some useful hints on this subject recently given in the "Engineer" may therefore be repeated here. As regards the material of which hose pipe is to-day manufactured, it is evident that flax or canvas is most in favour; although the London Fire Brigade prefer rubber-lined hose. This is supposed to be on account of the superior delivering capacity of hose of this description. For works and offices, however, a good flaxen, hand-woven hose will be found to answer every purpose to which it can be legitimately put. Such hose, however, is not particularly cheap. Hose should not be specified to be too strong, or it will be heavy and clumsy. A bursting strain of 300 lbs. is enough; and for this pressure the hose need not be very tightly woven, which is a further advantage. Such a hose gets thoroughly wet and swells perfectly water-tight after the first few minutes' use. The Admiralty are large buyers of hose, and they insist upon its being oak-tanned. Where a hose is not often used, as in the case of offices and public buildings, what is wanted is something that will not quickly perish when folded up. This consideration debars anything in which india-rubber is used. It can hardly be insisted on too strongly that in regard to this matter of selecting and keeping fire-hose, every care should be shown to get a good and suitable article in the first place, and to keep it in effective condition. In connection with the latter requirement, it may sometimes be a question how often the neatly-coiled hose pipe stowed away in its glass case on the landing of a public building, is laid out, connected up, and tested as in actual use. Yet unless this is done, it is impossible to make sure of the condition of such perishable fittings.

### The "Thermit" Process of Metal Welding.

During the meeting of the Iron and Steel Institute in Paris, a display was made by Mr. E. D. Lange, of Manchester, of Goldschmidt's method of producing intense local heat for certain metallurgical purposes. The principle underlying the process is not new, being the intense chemical action between aluminium and certain metallic oxides; but the novelty of Dr. Goldschmidt's invention consists in the manner in which the action is developed and applied to practical purposes. It has been discovered that it is not necessary to heat the whole mass of aluminium and metallic oxides to the ignition temperature, as it is sufficient to start ignition at any one point, when the reaction will proceed throughout the mass. Further, it was found that the reaction in the case of some oxides can be started with an ordinary match. The combination here suggested is obvious; and in this way Dr. Goldschmidt succeeds in melting pure iron at such a temperature that it will cut into solid steel like a stream of boiling water into ice. In this manner welds can be produced in railway metals, fly-wheels, and other massive iron scantlings *in situ*, by merely melting iron oxide and aluminium together in a crucible and pouring the fluid metal into the proper place. The Chemische Thermo-Industrie at Essen makes a preparation expressly for this purpose, called "thermit." It is considered that extensive use will in future be made of this process, with the object of increasing the conductivity of electric tramways and so reducing the risk of the electrolysis of gas and water pipes. Tube welding is done in the same way. No flange joints for piping will henceforward be required. All repairs are easily effected by cutting out the defective piece of pipe and welding another piece in its place. Hard soldering can be done in the same way. One of the greatest triumphs of the process is the making good in place of broken teeth of cog wheels of any size.

### Incandescent Gas-Burners for Lighthouses.

In a report published by the "Engineer" on the lighthouse engineering exhibits at the Paris Exhibition, it is remarked that the introduction of the incandescent gaslight marked an important development in connection with lighthouse burners. In the French lighthouse service incandescent gaslight is used in many places. Several of the specimen lanterns shown at Paris are lit in this way. As the fruit of a long series of experiments, carried out by the Engineers of the Service des Phares, two distinct forms of incandescent gaslight have been adopted for use in the service. In one, the burners are supplied with compressed oil gas, on Pintsch's system; and in the other, the combustible is vaporized petroleum used with the incandescent mantle in a similar way. Examples of both are shown in the museum of the Depôt des Phares. Of the two systems, the oil gas is preferred, and is used wherever a gas-works can be installed or a supply of compressed gas provided in cylinders in the usual way. Petroleum vapour burners, however, give excellent results, and require little plant. The necessary arrangements are limited to a couple of small containers with connecting pipes, which can be mounted on the lens-table of almost any light-house apparatus. Experiments are now being made with acetylene, both as a luminous flame and in connection with incandescent mantles. The results so far obtained are regarded as promising well. With compressed oil gas, the mantles are worked at a pressure of $2\frac{3}{4}$ lbs. per square inch; and about eight volumes of air to one of gas are thus burnt. With Welsbach mantles of 45 millimetres diameter, the illuminating power per burner is 600 candles; and 350 candles for the smaller type, 30-millimetre mantle. This is now the standard unit of power adopted for the incandescent gas-burners in the French light-house service, both for compressed oil gas and vaporized petroleum burners. The latter are a sort of lucigen light apparatus. It is not so reliable as the oil-gas system.

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**Denaturalized Alcohol for Incandescent Lighting.**—At the recent International Congress of Applied Chemistry in Paris, M. Arachequesne read a paper on the use of denaturalized alcohol, in the course of which he remarked that the discovery of Dr. Auer von Welsbach had made incandescent illumination by alcohol possible. To obtain incandescence, the mantle must be heated to a temperature of 2550° or 3000° Fahr.; and there must be adequate pressure of vapour. Bunsen burners are employed, each containing a small spirit volatilizer; so that the burner really represents a gas-works. To ensure good working, care must be taken that the gas-supply pipe does not become obstructed by dissociation, which would occur with alcohol at temperatures above 572° Fahr.

**The "Transactions" of the Institution of Gas Engineers** for the past year have just been issued in the customary form. The volume contains the papers read at the meetings held on the 2nd and 3rd of May, 1899, under the presidency of Mr. F. D. Marshall, of Copenhagen, with the discussions thereon; and an account of the interesting visit paid by the Institution to Berlin and Copenhagen in September. The Appendix contains a short description of the Gitschinerstrasse and Schmargendorf Gas-Works in the former city, accompanied by two plates; and the President furnishes particulars of the new Frederiksberg works of the Danish Gas Company, of which he is the Engineer, as well as of the Eastern Gas-Works in Copenhagen, which are under the supervision of Herr Irminger. A plan of each works is given, together with a plan and elevation of the holder constructed on the Intze principle at the Strandvej works of the Company. The Appendix also contains, as usual, abstracts of a few papers dealing with subjects connected with the gas industry which have appeared in various technical publications.

# TECHNICAL RECORD.

## SELF-LIGHTING MANTLES.

In a previous issue (*ante*, p. 959) we gave an indication of the scope of two articles by M. Pierron, in the "Revue de Physique et de Chimie," in which he described some of the types of self-lighting burners now before the public. In a later article, he dealt with the application to mantles of the principle of automatic ignition—that is to say, the addition to the mantle of an appliance whereby light can be obtained on merely turning the tap. These devices all comprise a mantle of the rare oxides (thorium-cerium); an igniting substance, having a basis of platinum black, or of blacks of the same group, which lights under the action of the gas; and a part intended to effect lighting. The first two features are practically the same in all the appliances; it is the igniting agents only which differ. They may be grouped in three classes, according as ignition is produced by platinum wire, by divided platinum and rare oxides raised to a state of incandescence, or by rare oxides only.

Dealing with these groups in the order named, M. Pierron points out that, in the case of lighting by platinum, the igniting substance, as in the arrangement of Rosenfeld, alluded to in the previous article, kindles under the influence of the gas and heats the platinum wire, which, becoming active in its turn, causes a combination of the gas and oxygen, attains a white heat, and lights. The first attempt in this direction was that made by MM. Deselle-Gillet, whose French patent is dated July 7, 1894. These inventors adapt to the mantle a mixture of platinum and palladium blacks enclosed in a bag of platinum gauze, or of artificial gauze made in accordance with the English patent of Stockes (dated Jan. 16, 1882), by calcining cambric saturated with platinic chloride. Killing, whose patent is dated Sept. 24, 1897, makes a tissue by intertwining very fine platinum wire with the igniting wire (a mixture of thorium and platinum black), and fixes the whole to the top of the incandescent substance.

Passing on to consider the mixed system of lighting, M. Pierron states at the outset that it is based on a different principle. It is well known that the mixture of air and gas only raises platinum black to a dull red heat, which will not cause ignition; whereas a mixture of refractory porous materials containing a small quantity of platinum will, under similar conditions, become incandescent and cause ignition. Sulzbach, according to his patent of Sept. 22, 1895, applies this idea by saturating the mantle with a platinic solution, and placing an igniting body against this part. Duke, whose American patent is dated July 27, 1897, selected as the source of heat a small piece of meerschaum charged with black, which he placed at the upper part of the mantle. His arrangement is shown in the accompanying illustration (fig. 1).

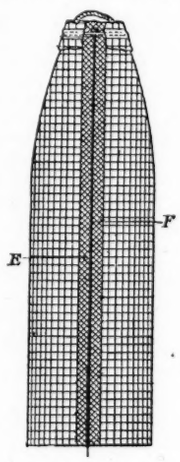


FIG. 1.

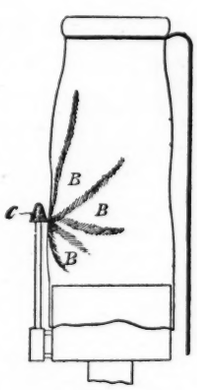


FIG. 2.

A line of platinum E, obtained by the calcination of very concentrated chloride, transmits heat to a broad band F (composed either of the same material as the mantle or of carbonate of lime mixed with a very small proportion of platinum chloride) painted upon the line E. Unfortunately, the igniting substances known at that time could not stand the prolonged action of heat; and consequently they soon lost their properties. In order to make them last longer, MM. Perl et Cie. constructed, under their patent of July 7, 1897, a mantle provided with a platinum spot, against which the lighting ball, located at the end of a spiral, was placed. When exposed to the stream of gas, the ball became red, and lighted the spot; but as soon as the burner was started, the spiral expanded and brought the ball into the cold part of the appliance. More recently, Herr Schultz has devised a special burner, in which a current of cold air is produced in the centre of the mantle. The igniting pastille is placed in the stream of gas so as to be constantly cooled. The arrangement is described in the inventor's German patent of June 19, 1899.

It may happen that the defective portion of the appliance is not the igniting substance, but the part intended to complete the lighting. It is well known that when one or several lines of platinum chloride are traced upon an incandescent mantle, the spots obtained gradually grow pale under the action of heat, and finally disappear; the parts subjected to the highest temperature being the first to go. MM. Butzke et Cie. endeavoured to remove this defect by taking a Killing self-lighting mantle, and adding two lines of iridium chloride from the top to the bottom. After calcination, there remained a deposit of iridium, which was much less fusible than platinum. The impossibility of obtaining a salt of constant quality and sufficient purity, however, prevented the arrangement from working with regularity. Various inventors have sought in other directions means of remedying the defects indicated. Franke and Hurwitz, whose French patent is dated Feb. 5, 1897, tried to prevent the formation of a continuous metallic deposit by mixing with volatilizable substances a dissolved platinum salt, and saturating rare oxides therewith. Early in the following month the above-named gentlemen, in association with M. Mengers, took out a patent for saturating the incandescent substances with a solution prepared with metals of the platinum series and a metallic oxide (silver or copper oxide). Herr Stoecklin, according to his English patent of March 21, 1898, subjected incandescent oxides to treatment by an alkaline liquor, having a base of potash, soda, or ammonia. In September of the same year, M. Pierron took out a Swiss patent in which he described the arrangement shown in fig. 2. Taking a solution of acid oxides, he traced upon the mantle several lines B starting from one centre, deposited divided platinum thereon, and applied the igniting substance C at the point from which the lines diverged.

M. Pierron next deals with ignition by the oxides which are constituent elements of the mantle itself. He remarks that this is the application of a phenomenon which may be observed every day. When a badly-regulated burner is started, the gas very frequently lights back—the flame being produced at the base, where the gas enters. By turning out the gas and immediately reopening the burner, the material of the mantle will have obtained sufficient heat to effect a combination of the gas with the oxygen of the air. It will then begin to glow, and eventually ignite the gaseous mixture. This result is achieved by Mr. Simonini, whose American patent is dated April 19, 1898, by employing textile fabrics. One of these, which acts as the igniter, contains a mixture of about 60 per cent. of platinum black, or analogous substance, and 40 per cent. of thorium or cerium oxide. The other contains about 92 per cent. of thorium oxide, 4 per cent. of cerium oxide, and a like quantity of oxide of neodymium. The inventor provides in certain cases for the addition of 0·1 to 0·2 per cent. of ruthenium. When once the second fabric has been heated by the first, ignition is effected.

As self-lighting mantles are sold collodionized, like ordinary mantles, they possess the advantages of ease in fitting and great convenience in use. At the same time their simplicity of action, theoretically—ignition of the gas being obtained by simply turning the tap—presents certain delicate points which M. Pierron thinks should be indicated. As previously remarked, the two constituents—the igniting substance and the thread, streak, or spot of platinum—have very distinct functions, which it is absolutely essential should be perfectly performed. The object of the igniting body being to condense the oxygen of the air and oxidize the gas, its pores must be in a condition to stimulate this action. Its composition should be such as to allow of its remaining in the flame unaltered; but even when fulfilling this condition it is liable to fail if the gas-tap is not perfectly tight. In fact, the quantity of gas which escapes being too small to cause a rise of temperature, the pores gradually become filled with gas which takes the place of the oxygen; thus preventing oxidation when it is desired to bring the burner into use. In order to remedy this defect, it is sufficient to expel the absorbed gas by hermetically closing the tap for some minutes, or by heating the body, or merely blowing upon it.

To ensure regular working and the efficient combustion of the gas, the igniting thread or spot should have a sufficient supply of oxygen. The best position is attained when the mantle is placed just between the zone of gas and the air. If, for any reason, such as the displacement of the mantle, excess of pressure, &c., the jet of gas completely surrounds the igniting substances, the quantity of oxygen is inadequate, they do not increase in temperature above dull red heat, and there is no ignition. In this case the mantle must be more favourably placed; and if the pressure is too high, the tap must be closed so as to decrease it progressively. At a given moment, the thread or spot is in a suitable position, and ignition results.

Attempts have been made on several occasions to utilize mantles composed of platinum, or of alloys of this group; but various difficulties—such as the use of gas under pressure, the diminution of illuminating power after a certain period of working, and so forth—which have not yet been overcome, have rendered their practical application impossible. By the addition of durable igniting pastilles, however, they might be converted into very reliable self-lighting mantles.

M. Pierron concludes by pointing out that self-lighting mantles, as is the case with automatic illuminating devices in general, always act best when they have just been lighted, and have acquired a certain amount of heat. They should therefore, he says, not be subjected to the action of gas except after being out

of use for at least ten hours. In practice, self-lighters should fulfil the following conditions. They should: (1) Glow and light almost instantaneously when subjected to the action of gas. (2) Preserve their catalytic properties for a considerable length of time. (3) Be arranged in such a manner that, when once the tap is opened, the gas flows directly on to the pastille, because the portion which is not brought into contact is unburnt, and vitiates the atmosphere. These conditions fulfilled, automatic igniters possess great advantages. In the first place, by their adoption the use of matches, spirit, &c., is rendered unnecessary; next, explosions are impossible, inasmuch as escapes from the burner, if at all appreciable, cause ignition; and, finally, they are very inexpensive. It may therefore be regarded as highly probable that the development of automatic gas lighting, which was slow at first, owing to certain slight difficulties already referred to, will be much more marked in the near future.

## REGISTER OF PATENTS.

**Prepayment Gas-Meters.**—Cowan, W., of Edinburgh. No. 18,727; Sept. 16, 1899.

This invention relates mainly to devices for actuating the prepayment or measuring-out mechanisms of various forms of coin-freed gas-meters, where a pointer-and-scale price-varying mechanism is used. The improvements are more particularly applicable to mechanism in which the prepayment device is always moved in one direction—as is described, for example, in patent No. 21,108 of 1894. The pointer-and-scale device is a modification of that described in patent No. 11,537 of 1890.

One part of the invention consists broadly in applying a pointer-and-scale price-varying mechanism to a prepayment mechanism in which the coin-pocket shaft is turned continuously in one direction to set the prepayment or measuring-out device for delivery of gas (no setting back of the operating handle to the original position being required), and in devices enabling this application to be carried into effect. Another part consists in providing a device which allows the spring holding the measuring-out wheel driving pawl in gear to be tensioned only when it is actually driving the wheel, and therefore to be free from tension except when the prepayment mechanism is being operated by means of a coin. A still further part consists in a new construction of prepayment mechanism of the type in which the coin-pocket is in two parts, which are joined by the coin itself; and in adapting to this mechanism a price-varying device of the pointer-and-scale type. In this mechanism, the driving handle makes a partial rotation in acting on each coin, and is brought back by a reverse rotation to the starting position.

In carrying the first part of the invention into effect according to one modification—see figs. 1 to 4, an elevation of the prepayment mechanism and price-varying device, looking on the back of the meter-dial, a plan of same, an elevation of the side cheek and operating handle, but looking on the opposite side of the device, and an elevation of one form of price-varying pointer and scale—a shaft is provided having a handle adapted to be operated from the outside of the meter. In this shaft is formed a coin-pocket, with its plane at right angles to the axis of the shaft. The coin-pocket has a through passage adapted to let a smaller coin than that to be used pass freely through. The coin-pocket or coin-wheel has formed on one side a ratchet-wheel, from which two or more teeth are omitted; and at this point a deep notch is provided. An arm is fixed to the back of the ratchet-wheel; and on the end of the arm is supported a driving pawl, which projects over the measuring-out wheel geared up to the measuring-out mechanism. A double-armed ratchet-pawl is provided, pivoted on the frame in which the coin-pocket wheel is supported. This

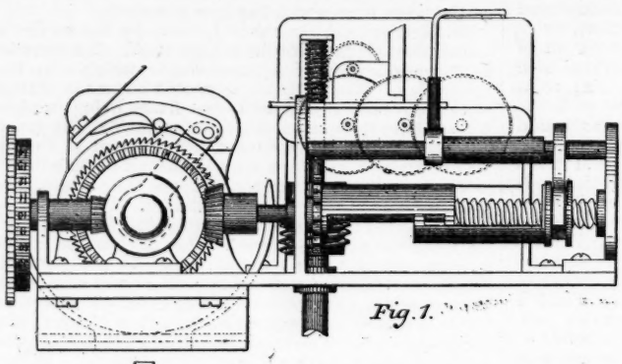

Fig. 1.

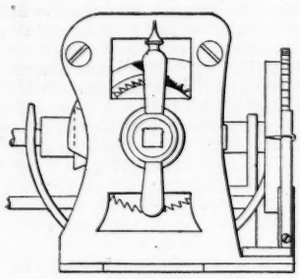

Fig. 3.

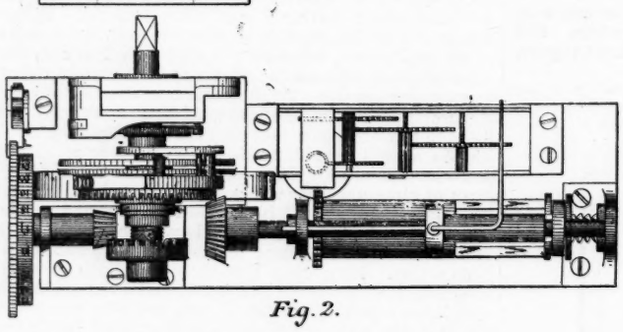

Fig. 2.

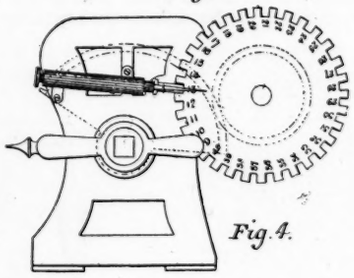

Fig. 4.

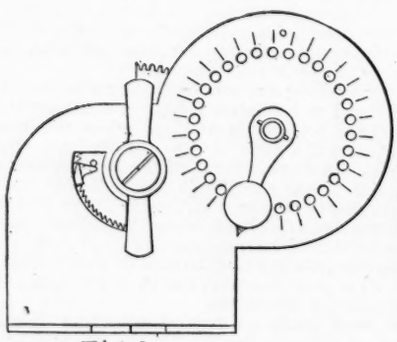

Fig. 5.

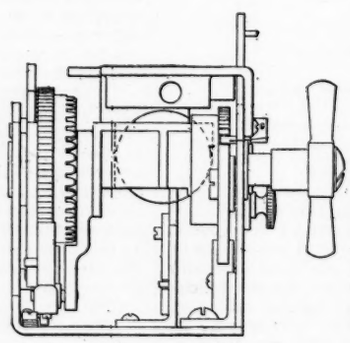

Fig. 6.

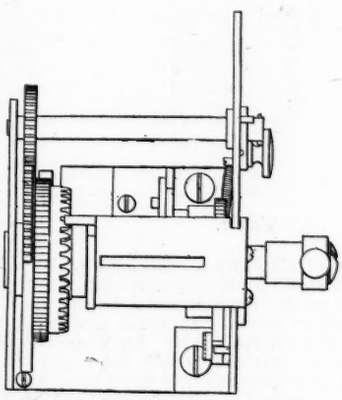

Fig. 7.

pawl is held forward against the wheel by a spring. A pin on the wheel is provided, which catches on one arm of the pawl when the wheel is attempted to be turned by hand before the penny is placed in the coin-pocket. The other arm of the pawl lies in the deep notch on the ratchet-wheel; and this arm of the pawl is adapted to engage with the teeth of the ratchet-wheel to prevent it being turned backwards, after a penny has been placed in the slot, and turning forward has become possible. The non-return ratchet may be provided on any other suitable part of the coin-pocket shaft.

When a penny (where a penny is the proper operating coin) is placed in the coin-slot, it falls into the coin-pocket, and is supported by the ends of the pocket in such a position as to be projecting out of the pocket; and this part of the penny, when the outside handle is turned, presses against the long arm of the two-armed pawl, and forces it clear of the pin on the coin-pocket wheel—thus enabling forward rotation to take place. During this forward rotation, the spring presses against the two-armed pawl, the short arm of which is now engaging with the teeth of the ratchet-wheel; and this prevents the handle being turned backwards.

When about half a rotation has taken place, the operating coin drops freely out of the coin-slot into a suitable receptacle. When nearly a complete rotation of the coin-pocket shaft has taken place, the short arm of the double pawl drops into the deep notch in the ratchet-wheel; and this permits the long arm of the pawl to pass into a position to again catch the pin on the coin-pocket wheel, and prevent a second turn being given to the latter until another penny has been placed in the slot.

The measuring-out or prepayment wheel is placed on a journal whose axis is in line with the coin-pocket wheel-shaft, but which is placed somewhat to the rear of the shaft. The journal, which is hollow and is rigidly fixed to the supporting frame, carries firmly attached a semi-circular disc, whose radius is somewhat greater than that of the ratchet toothed measuring-out wheel. The pawl which is carried by the arm fixed to the coin-pocket wheel is provided with a pin, against which bears the spring holding the pawl into gear with the measuring-out wheel. This pin also rides on the edge of the semi-circular disc, which acts as a platform holding the pawl clear of the teeth in the ratchet measuring-out wheel. A second semi-circular disc is provided, fixed to a spindle, which passes through the hollow journal on which the measuring-out wheel rides; and this spindle is geared up to a notched wheel provided with a locking pawl adapted to indicate by its setting the quantity of gas which the mechanism is set to deliver for a penny. The disc is of exactly the same radius as the fixed semi-circular disc; and it also acts as a platform to keep the driving pawl out of gear with the measuring-out wheel. When the moveable disc is set to exactly correspond with the position of the fixed disc, the meter is set for supplying the maximum quantity of gas for a penny. As the notched wheel is turned round, so as to make the semi-circular disc overlap less and less, the latter will hold the driving pawl off the measuring-out wheel for more than half a revolution; so that a less quantity of gas will be supplied for each coin. The measuring-out ratchet-wheel has a crown-wheel formed on its face, which lies opposite to the fixed semi-circular disc, and gears with a pinion-wheel, driving the screw of the meter mechanism which sets the meter free to deliver any given quantity of gas, as described in patent No. 21,108 of 1894. The notched wheel and spring pawl in gear with the moving semi-circular disc form a pointer and scale—the pawl being the pointer, and the scale being arranged around the outer circumference of the notched wheel.

In carrying the second part of the invention into effect, according to one modification, the driving pawl just described is adapted to operate the measuring-out wheel with a spring, which is so formed as not to be in tension when the mechanism is at the starting-point; and a curved segmental plate is provided, which acts as a kind of roof. When the coin-pocket wheel and the arm carrying the driving pawl are turned, the pawl-operating spring (which may be fixed to the pawl) is tensioned by passing under this roof, so that, through the whole arc in which the driving pawl could be in gear with the ratchet-wheel, the pawl spring is under tension.

In carrying the third part of the invention into effect—see figs. 5, 6, and 7, a side elevation, front elevation, and a plan—according to one modification, a suitably arranged frame is provided; and mounted thereon in suitable journals is the operating shaft carrying the coin-pocket. The shaft and the pocket are preferably divided into two separate parts; and it requires the presence of a coin before the portion connected with the handle will operate the other portion which acts on the prepayment mechanism. The coin-pocket (a coin being present in it) has on each occasion a definite movement which may amount to one-half of a revolution on the axis, or more, as may be arranged. A segmental band prevents the escape of the appropriate coin while the pocket is being moved round to the terminal point where the band ends, and so allows the coin to drop out. But, in order to prevent the possibility of the coin being brought back in the pocket in the event of its failure to leave it readily at the terminus, there is a poised detent lever at the end of the segmental band, which has to be pushed aside as the coin passes, but immediately resumes its normal position when the coin has passed. The lever then acts as a barrier against the coin's return. It is equally necessary to prevent the coin and pocket from being turned back at any intermediate stage of the journey; and for this purpose ratchet-teeth are formed on the handle portion of the pocket. Into these ratchet-teeth a pawl (which is pivoted on the frame) gears whenever the movement of the pocket is reversed at any point short of the terminus; but, when this has been reached, a pin on the ratchet (coming in contact with a projection on the pawl, close to the fulcrum) instantaneously draws back the pawl, and places it under the control of a poised detent lever, or a spring, so that the pocket can now be returned to its starting point. The attainment of this position brings about the release of the pawl by means of a pin on the ratchet, which, acting on the other side of the projection on the pawl above mentioned, replaces the pawl in gear with the non-return ratchet.

One end of the pocket is barred against the escape of the proper coin—for example, a penny—but not against the escape of a smaller coin, such as a halfpenny. And in certain cases, for the purpose of preventing the segmental band which is employed to retain the right coin in the pocket from also retaining the smaller coin which ought to escape, the band may either be placed at one end of the pocket, so as to leave space for the smaller coin to drop out, or if the band be placed round the middle of the pocket, a sufficient portion of it may be cut away to allow a smaller coin to pass out, though the appropriate larger coin is retained, at this point, by an end projection in the pocket.

The two portions of the shaft and pocket are only united when a coin is present. The part which receives its motion from the handle portion, in consequence of a coin being present in the pocket, has an arm rigidly attached to it, and on its outer end a pawl (with or without a spring), capable of gearing into the ratchet-teeth of a measuring-out wheel mounted loose on the shaft; and it only moves when driven onwards by the pawl above referred to, but does not return when the pawl returns.

In order to enable the quantity of gas supplied by each coin to be varied according to the price of gas, the extent of the measuring-out wheel's advance is limited by means of the moveable semi-circular disc before mentioned, part of whose edge forms a platform which keeps the pawl out of gear with the ratchet on the measuring-out wheel, for a greater or less part of the pawl's movement, as operated by the handle. This movement of the pawl-arm under the action of the handle is a movement through a fixed arc, so that a greater or less portion of the pawl's movement is rendered idle by the platform. Only that part of the movement which takes place after the pawl has left the platform operates the measuring-out wheel and mechanism. The disc whose edge acts as a platform as just described, is carried loose on a shaft; and in another part of its circumference teeth are cut gearing with a wheel on a shaft carrying a pointer which moves over a scale. The setting of this pointer in relation to the scale controls the position of the platform in relation to the moving pawl. The pointer may be fixed at any position, as desired, corresponding to the quantity of gas to be supplied for the coin.

The coin-pocket described above is provided with a circular ridge or guard, to prevent coins being inserted in the coin-pocket except at the starting position of the coin-pocket. A shutter closes the coin-slot when the maximum number of coins for which the meter is intended at one time have been inserted.

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**Atmospheric Gas-Burners.**—Sinnberg, T. E., of Camberwell, S.E. No. 18,827; Sept. 18, 1899.

This invention in atmospheric gas-burners used for incandescent lighting, has for its object to enable the gas supply and air supply to be independently regulated by valves capable of being adjusted independently of each other, "so as to enable the variations of pressure to which the gas may be subject to be readily compensated, and the best possible result in illumination to be always attained."

Fig. 1 is a vertical section of a burner provided with independent air and gas regulating valves; while figs. 2 and 3 show two forms of burner attachment adapted to be fitted on the head of an incandescent burner for burning gas without previous admixture of air.

*Fig. 1.*

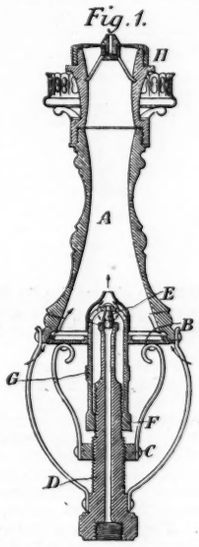
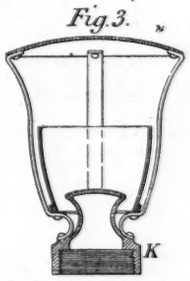



*Fig. 2.*

*Fig. 3.*




The tube A, wherein the streams of gas and air mingle on their way to the ignition orifice, is supported on the gas-supply tube D; and the lower end of the tube is adapted to form the seat for a disc valve B, connected to a nut C, fitted to screw upon a threaded part of the gas-supply tube, so as to enable the valve to be thereby raised or lowered at will for the purpose of regulating the admission of air through the annular opening between the valve and its seat. The upper end of the gas-supply tube is not closed, as usual, by a perforated diaphragm (usually called an "injector"), but is adapted to form the seat for a conical valve E, whereby the area of the gas-emission aperture may be varied at will, without, however, thereby altering the area of the air-admission orifice, or necessitating any re-adjustment of the air-admission valve. The valve E is for this purpose carried by spider arms at the upper end of a tube G, passing freely through the disc valve B, and provided with a nut F screwing upon the upper part of the gas-supply tube. The arrangement is such that the nuts C and F are both readily accessible from below for independently adjusting the valves B and E "without disturbing the burner, or causing any oscillation of the mantle which would lead to its speedy destruction."

The gas issues beneath an upwardly convergent nozzle fitted over the upper end of the tube G, for the purpose of directing the issuing gas (in the form of a jet) upwardly and axially through the mixing-tube. The tube G is cylindrical; and the disc valve B makes a working fit about it, so that, while each is capable of adjustment independently of the other, no air can pass between the valve B and the tube G.

In order to enable an ordinary luminous flame to be temporarily obtained from the gas without previous admixture of air, should the mantle become unserviceable and another not be available, the patentee proposes to provide burner attachments (as shown in figs. 2 and 3) adapted to be fitted on the head of the atmospheric burner, from which the air supply is then entirely shut off by closing the valve B. The burner shown in fig. 2 is an ordinary batswing or fish-tail nipple I, carried by a cap J adapted to screw on to the head H of the mixing-tube A; while the burner shown in fig. 3 is also a cap K adapted to be screwed on to the head H, and provided with an annular series of minute orifices, whence the gas issues, and is burnt as in an ordinary ring burner.

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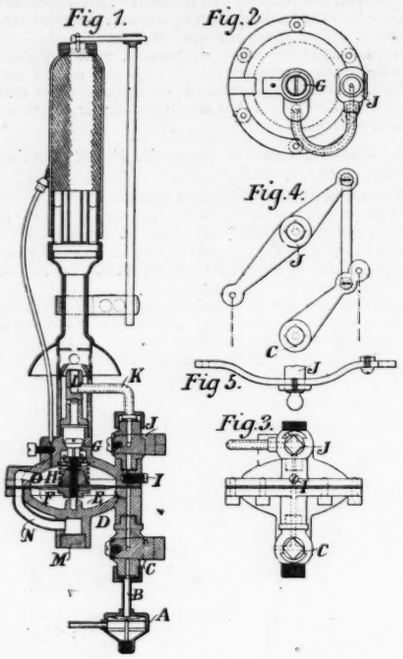
**Incandescent Gas-Lamps.**—Winkler, H., of Berlin. No. 23,229; Nov. 21, 1899.

The patentee remarks that in the employment of "intense incandescent gas-burners," which are fed with air under pressure, the necessity frequently arises that the burners should be employed for obtaining a less intense light, with a less gas consumption, and without the employment of air under pressure; and his invention has for its object to provide means whereby this can be effected. Furthermore, he points out that the jet of highly compressed air which streams out from the nozzle

possesses peculiar properties, the employment of which also forms the subject of the invention.

Fig. 1 is a vertical section of an incandescent gas-lamp having a controlling device fitted to the igniter; fig. 2 is a plan view of the lower portion, showing the parts necessary for illustrating the arrangement for




supplying the gas from the gas-chamber to the air-nozzle; fig. 3 is a side view corresponding to the plan view; and figs. 4 and 5 show, in side elevation and plan respectively, the link and lever mechanism of the controlling device.

The compressed air flows through the purifier A, the small tube B, and the cock C. After it has passed the latter, it flows through the lateral passage D into the air-chamber E, where, by pressure upon the diaphragm F, it raises the gas-valve G as it overcomes the tension of the spring H. The compressed air cannot pass out of the chamber, but merely holds the gas-valve open. The air also passes by the regulating screw I, and through the cock J and the tube K, and flows to the nozzle L, when the parts are in the normal position. The gas in this case flows through the supply-pipe M and the passage N into the gas-chamber O, and thence passes to the burner-nozzle. The gas is sucked up by the stream of compressed air, and "a quite peculiar mixture of air and gas is obtained, which, when burned in connection with the incandescent mantle, gives rise to a very intense light."

In the arrangement shown (as distinguished from nozzles heretofore usually made), the gas nozzles are arranged concentrically. Through the inner nozzle, which is provided with very small perforations, there flows a relatively small quantity of air, highly compressed, and having a high velocity, so that the powerful jets of air issuing from its small perforations not only draw up the gas supplied from the space around the nozzle L, but also the air which passes into the burner-tube through the openings above. "This result has never before been obtained in incandescent gas-lamps."

When now, for any reason, a less powerful illumination, "instead of the full intense light," is desired, the burner is supplied with gas only—the gas itself drawing in the air which it requires for combustion. This gas, however, does not pass through the valve G to the nozzle in the manner above described, as the nozzle has too large an opening, and would not produce the necessary jet of gas. For this reason, therefore, the gas is caused to flow from the gas-chamber O to the nozzle L. The connection is effected through a pipe, one end of which is fitted to a nipple upon the cover of the gas-chamber, and the other end of which opens into the three-way cock J, which, according to its position, cuts off the gas coming from the chamber O, or allows it to flow through so that in the latter case the gas can pass to the pipe K and nozzle L. In order, however, to prevent compressed air and gas simultaneously flowing through the pipe K and nozzle L, the cocks C and J are so connected that the air-cock C is closed when the cock J opens communication between the gas-chamber O and the tube K, and *vice versâ*—that is to say, the connection is broken when compressed air is passed through the cock C. This control of the cocks is effected by levers fitted to the plugs of the cocks; while a link connects the two levers in such a manner that one cock cannot be moved independently of the other.

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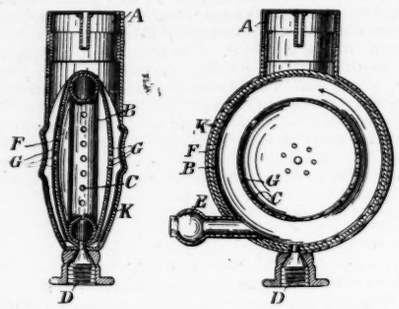
**Burners of the Bunsen Type.**—Trenenreuter, G., of Berlin. No. 13,162; July 20, 1900.

This invention relates to a burner for use with incandescent mantles, the object of which is "to produce an illuminating power of exceedingly great intensity, by means of an exceptionally thorough mixture of the gas with air, introduced under pressure, and by means of which the noise arising in the case of other burners of the kind—working with air under pressure—and other disadvantages are obviated."

Between the actual burner A and the gas-supply pipe, the apparatus which forms the main part of the invention is inserted. It consists substantially of a tubular ring B, furnished with openings C running inwardly. To this ring, the gas-supply pipe is connected and screwed by means of the nipple D; and the air-supply pipe is connected by means of the junction-piece E. The ring is seated in a casing F, provided on both sides with outlet-openings G. This casing has a felt lining on the outside, having openings corresponding with the openings in the casing. The main part of the apparatus is enclosed by an external casing K, furnished on the inside with a layer of felt; while in the upper part it assumes a cylindrical form. This cylindrical part carries the actual burner; and at its junction with the casing, openings are cut.




The action of the apparatus is as follows: If illuminating gas enters through the nipple D, and air through the junction-piece E, into the interior of the apparatus, the current of air, which, like the gas, is under strong pressure, carries the gas entering the ring at D along with it, and moves it forward through the ring B up to the point at which air enters at E. In this way, the two are very thoroughly mixed. The portion of the mixture which has not passed in a stream-like form through the small openings C is always seized again by the current of air constantly entering at E; and in this way, the mixing is carried on without interruption and in a vigorous manner. The mixture passing out through the openings C is, of course, freshly and completely mixed again by the meeting together of the different streams, and then passes through the openings G into the space between the inner and outer casing, and thence to the burner.

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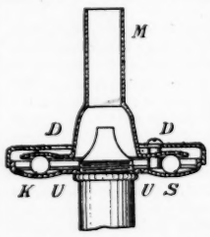
**Incandescent Gas-Light Burners.**—Hudler, J., of Glauchau, Germany. No. 13,545; July 27, 1900.

The patentee points out that, in his view, of the shocks which injuriously effect the mantles used in incandescent gas lighting those caused by horizontal oscillations of the burner are the most serious, and in street-lamps the most frequent. While a spring laid around the mixing-tube, and on which the crown of the burner rests, forms a good means of protection against the vertical shocks, as soon as the shock takes a direction deviating from the vertical, and is broken up into a vertical and a horizontal element, the spring becomes ineffectual. The object of the invention, therefore, is to provide means for counteracting these shocks; and the arrangement is intended to be used in combination with any known means for preventing vertical shocks.




A saucer or ring U is firmly connected to the ordinary jet of the incandescent burner, and formed with three or more smooth cup-shaped recesses S, in which an equal number of balls K lie. On these balls rests a flange or rim formed on the lower part of the mixing-tube M, and having cups or indents corresponding with the cups in which the balls are arranged. The mixing-tube is held in position by a ring or cover D secured to the ring. The crown of the burner is put on the mixing-tube, as hitherto, after a spring support has been supplied to the latter.

The working of the apparatus is as follows: When the gas pipe is affected by horizontal oscillations, they are transmitted to the ring U, and the balls effect slight rolling motions, and then return to a position of rest. Any transmission of the horizontal shock to the incandescent body is thus impossible. The cover D prevents any falling away of the parts lying on both sides of the balls, without impairing the mobility.

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## APPLICATIONS FOR LETTERS PATENT.

17,800.—Deluce, S. A. N., "Gas-engine." Oct. 8.

17,883.—Barby, Henry, and Co., Ltd., and Jackson, R., "Feeding appliances for elevators." Oct. 9.

17,920.—Jacobi, L. W. A., "Carbonization or heating of solid bodies." Oct. 9.

17,921.—Snell, C. S., "Compressing gas, air, or the like." Oct. 9.

17,945.—Deshler, C., and M'Allister, E. J., "Photometers." Oct. 9.

17,950.—Robinson, O., "Gas-engines." Oct. 9.

17,976.—Thomas, W. F., and Talbot, G. W., "Internal combustion engines." Oct. 10.

17,993.—Crossley, W. J., and Atkinson, J., "Purifying heating gas." Oct. 10.

17,999.—Coghlan, J. M., "Acetylene generating apparatus." Oct. 10.

18,078.—Bond, F. T., "Burning coal gas in combination with coal or coke in domestic fireplaces." Oct. 11.

18,112.—Tapin, L., "Self-generating gas-lamps." Oct. 11.

18,156.—Miles, W. P., "Automatically regulating the flow of liquids, gases, and electricity." Oct. 12.

18,188.—Naef, P., "Treatment of solid material with gas, especially applicable for catalytical reactions." Oct. 12.

18,191.—Naef, P., "Treatment of solid material with gas, especially applicable to catalytical reactions." Oct. 12.

18,208.—Theobald, W. & G., "Increasing the illuminating power of gas-burners." Oct. 12.

18,211.—Chandler, D. & S. B., "Revolving gas scrubbers and washers." Oct. 13.

18,271.—Gilbert, W. S., "Incandescent gas lighting." Oct. 13.

18,279.—Naef, P., "Treatment of fuel and the recovery of bye-products." Oct. 13.

## CORRESPONDENCE.

*[We are not responsible for the opinions expressed by correspondents.]*

### The Cost of Gas and Electricity for Public Lighting.

Sir,—Following the observations in your leader last week, I think you will be interested to see the enclosed report of the speech of the Chairman of the Bow Vestry. The entire lighting of Bow parish, including a good many streets which will still remain lighted with gas, cost only £1512 2s. 6d. for the year ending Midsummer, 1900; so that the addition of nearly £3000 a year is incurred by substituting arc lights on a comparatively limited length of roads. The extravagance is even more remarkable than the statement of the Chairman would lead you to expect.

H. E. Jones.

*Commercial Gas Company, Stepney, E., Oct.* 19, 1900.

[Enclosure.]

At a recent meeting of the Bow Vestry, the Chairman (Mr. Dalton), speaking on a motion for the adoption of the report of the General Purposes Committee, recommending rates for the quarter ending Christmas next amounting to 2s. 6d. in the pound, with still a deficit on the sewers rate—the highest rate ever made in Bow—said the electric light would cost £750 more than the gas did in the corresponding quarter of last year. "But who," he asked, "would say that, because £750 would have to be laid out, the people should not have the benefit of the electric light? They had to keep up with the times."

### The British Gas Engineering Profession.

Sir,—The final "Editorial Note" in your last issue, under the title of "The Problem of the British Gas Engineering Profession," referred to the increasing difficulty of obtaining competent men for the higher posts in the gas industry, and lamented the fact that the younger generation of gas engineers is not formed from the best and most suitable material. The problem is undeniably one of considerable importance; and many must have been glad to find that it had received notice at the hands of the "Journal," and that its treatment was of so sympathetic, and withal of so practical a nature.

But after all, is it surprising that the quality of gas recruits should fall behind that of those to other branches of civil engineering or to the sister professions? How can it well be otherwise? Is the general remuneration offered to gas engineers of such a satisfactory character that their calling is likely to attract the attention and draw the abilities of the most desirable class? Your "Wanted" advertisements give the answer. Even if such were not the case, when influence and inexperience are frequently found strong enough to capture positions from the industrious and capable, is it not natural that prospective gas engineers should hesitate a little before finally determining their lot? When ignorant shop-keeping Chairmen of Municipal Gas Committees, or *dilettanti* Directors of Companies have to be knuckled under to, how can the industry expect to gather to itself the best bred and most educated? "It is monstrous that men . . . should depend for their bread on their powers of 'carneying' to a Chairman of Committee, and judiciously keeping on the 'blind side' of some mountebank of a Town Councillor," recently said the "Journal" in an "Editorial Note" on a similar subject.

How can the Urban District Council, or Company's Board, best be shown the false economy of knocking its chief gas appointment down to the lowest bidder? How can the prestige of the gas engineer be most worthily upheld? By what means may the general tone of the gas profession be raised? Must not the initiative come from its members themselves? And, indirectly, would not the representation of our industry by one solid and successful Society, with energetic and well-paid officials, gathering round it a trained body of students, be calculated to further the best interests of all? May it not, therefore, be hoped that the near future will witness a thorough change, not only in the form but in the spirit of our organizations, and that both the scientific and temporal conditions of the British Gas Engineering Profession will be improved in consequence?

"Mihi Cura Futuri."

*Oct.* 17, 1900.

Sir,—Your article in the "Journal" for the 16th inst. touches a very sore point in the minds of many gas engineers, and raises a question the free discussion of which ought to bear good fruit. Why do not more of the best of our young men push to the front of the gas engineering profession?

The blame is not all with the young men. There are doubtless plenty of well-educated, energetic, "stick at nothing" young fellows with the training and instincts of gentlemen who would be only too glad to enter the profession and would become shining lights in the van of its progressive development if—but "there's the rub!" While other professions offer equal or greater opportunities of developing their latent talent, and obtaining a respectable social position, they do not present in equal degree the uncertainties and discouragements which throng the way to eminence in the gas profession.

The Gas Committees of Local Authorities have much to answer for in the state of things you deplore. The miserly salaries offered by many Gas Committees for services the efficient discharge of which demands a high standard of education and business ability, and a thorough practical training, present no inducement to young men who can obtain better things in more attractive walks of life; and the shameful practice of bestowing responsible appointments upon those who are willing to undertake them for the lowest remuneration is at once degrading to the profession and subversive of that commercial morality which should be found in a public official. How many well-educated and thoroughly competent young men have had to stand aside during recent years while this mischievous policy has given preference to those who were ready to accept a salary upon which no self-respecting educated man can possibly live honestly.

Again, it is degrading to a man of intelligence and refinement to occupy a position in which he is at the mercy of the local small tradesman, whose position on the Council dresses him "in a little brief authority," and enables him to bully officials, and interfere with them in their management of technical matters of which he is utterly ignorant. There is not a man in the profession to-day, outside the larger gas-works, who—if he honestly speaks his mind—would not prefer to serve a Company rather than a Local Authority. Until gas engineers under Local Authorities are given a standing which will render their position secure, and their dismissal (save for proved incompetency or some other proper reason) out of the power of the truculent Councillor with a grievance, the best men will not be found anxious to tempt fortune in that field—at any rate in works of small and medium size.

Another reason which may account for the dearth of really suitable young fellows is to be found in the lack of facilities for obtaining the special training required, outside the works with which they are connected. If it is desirable in the interests of the gas engineering profession that young men of the kind indicated should make choice of that profession for their career, it is surely consistent with the object of the Gas Engineering Societies that they should assist such young men in their efforts to obtain technical training and information. But beyond opening the door to them as "Students" and "Associates," the great representative Societies have done nothing; and there is no set standard of proficiency, the attainment of which would entitle a young man to a full certificate from either of the two representative bodies of the profession, such as would be a guarantee to Companies or Local Authorities that the candidate before them was genuinely qualified for their selection.

When small Gas Companies and Local Authorities learn to estimate at their real worth, moral character, education, business capacity, and thorough professional ability, and the organized resources of the gas engineering profession are utilized to assist and guarantee the technical equipment of otherwise suitable young men, there will be no lack of recruits of the right stamp eager to enter the profession.

A Provincial Gas Engineer.

*Oct.* 19, 1900.

**The Beckton Compensation Case: A Correction.**—Messrs. Bedford, Monier-Williams, and Robinson, the Solicitors to the Gaslight and Coke Company, write to correct the report which appeared in the "Journal" last week of the above-named case. They say that "in the action under the Employers' Liability Act, judgment was given in favour of the Company, with costs against the plaintiff. It was in the subsequent application by the plaintiff's Counsel, under the Workmen's Compensation Act, for a weekly payment during his incapacity, that judgment was given for payment of 10s. 6d. a week during such incapacity." The name of the Counsel who appeared for the Company should have been given as Mr. H. W. Loehnis.

**Ignorant Plumbers Make Bad Meter-Fixers.**—At the Whitechapel County Court, last Tuesday, Mr. Alexander, a tailor in the district, was summoned by a plumber for £6 for work done. The plaintiff had fixed a meter at defendant's house, but had done it so badly that it was impossible to get a light. A gas inspector having proved that the meter had been improperly connected, and that all the fittings leaked, judgment was given against the plaintiff.

**Committal for Stealing Gas.**—At the Ashford (Kent) Police Court recently, a cycle manufacturer named Hayward appeared to answer a charge, on the information of Mr. John Morton, the Manager of the Urban District Council gas-works, of feloniously stealing 129,000 cubic feet of gas, value £20, on Sept. 22, and other dates. The allegation was that, by means of a bye-pass, defendant had taken the gas from the service pipe without its passing through the meter. He was committed for trial at the East Kent Quarter Sessions, where he appeared last Tuesday. Mr. Glyn addressed the Court in mitigation of the penalty, and called Dr. Claude Vernon, who gave defendant an excellent character. The Court were asked to deal with the accused under the First Offenders' Act; but the Judge (Sir L. Selfe) said they could not do this. Under the circumstances, however, the prisoner would be sentenced to three calendar months' imprisonment in the second class.

**Assessment of Reservoirs and Filter-Beds.**—At the last meeting of the Hampton District Council, the rate collector (Mr. Roberts) called the attention of the Council to the temporary division of the Grand Junction Water Company's assessments to the general district rate, as regarded reservoirs and filter-beds. After correspondence with the Company, the matter was referred to the Union Assessment Committee; and he arranged for an interview with the Company. In the correspondence which took place, the Company asked that £5000 of their rateable value should be regarded as being for filter-beds and reservoirs. He felt this was too much; and the Secretary (Mr. Goodwin) consented to reduce the sum to £4000, which figure had been agreed to by the Company. Mr. Roberts said the difference of £1000 meant £200 on the year's rates in favour of the Council. It was to represent temporarily only the proportion of rateable value on which the Company would pay one-fourth of the rate; and he asked the Council to pass a resolution confirming the arrangement, without prejudice to what might be done in future, as the whole of this class of property in the Union was being re-assessed. The request was granted.

**Sales of Shares.**—A sale of £10,000 of new ordinary stock of the Tynemouth Gas Company took place yesterday week at the Company's offices, North Shields. The prices ran between £115 10s. and £119 10s. per cent.; the average being £116 10s. 4¾d. When paid up, the stock will be entitled to a maximum dividend of 5 per cent. per annum, and will rank for dividend with the existing consolidated and new ordinary stock. Under the powers of the Borough of Portsmouth Water Order, 1898, the fifth batch of 1500 new ordinary £5 shares in the Portsmouth Water Company was submitted to public competition on Tuesday evening by Messrs. Penney and Clark, of Southsea. Of the total number, 1085 shares were sold at £6 15s. per share, and 415 at £6 17s. 6d. each. The gross return was £10,176 17s. 6d.—a premium of £2676 17s. 6d. The shares are to carry a dividend of 5 per cent. per annum. On the same day, 800 £5 shares in the Tonbridge Water Company (last dividend 6¼ per cent.) were disposed of at prices ranging from £8 2s. to £7 10s. per share. Mr. W. E. R. Randall last week offered for sale by auction 500 ordinary 7 per cent. shares (new issue) of £5 each in the Brompton, Chatham, Gillingham, and Rochester Water Company. They were sold at £10 and £10 2s. 6d. each.

# MISCELLANEOUS NEWS.

## LONDON LOCAL AUTHORITIES AND THE PRICE OF GAS.

### Conference at the County Hall, Spring Gardens.

A conference between the Parliamentary Committee of the London County Council and representatives of the City Corporation and the Vestries and District Boards of the Metropolis was held in the hall of the Council, Spring Gardens, last Wednesday. It was convened, in pursuance of a resolution passed on the 17th of July, to consider "the charges for gas made by the London Gas Companies, the quality of the gas supplied, the quantity supplied through slot meters, and the action which should be taken in the interests of the gas consumers." Mr. E. A. Cornwall, the Chairman of the Parliamentary Committee of the Council, occupied the chair; and there were present Mr. G. H. Radford, the Vice-Chairman of the Committee, and eight other members of the Council, as well as about sixty delegates.

The Chairman, after a few words of welcome to the representatives, said the gas question in London had always been a matter which had created a good deal of controversy; and if they went back for a moment to its early history, they found that it was as long ago as 1810 when the Gaslight and Coke Company—the same Company, strangely enough, that they really found so much fault with to-day—obtained their first Act of Parliament enabling them to supply gas in the Metropolis. One of the features of the Act was that it contained a clause in reference to the powers which the Company should have as regards the price to be charged for gas for public lighting. The clause in the Act was: "That every contract in every parish should be null and void if the price charged for lighting with inflammable air should be greater than that paid for lighting any part of London with oil." So that it was no new doctrine that any powers granted by Parliament to the Gas Companies should prevent them from charging more for public lighting than they were charging their other customers. From 1810 to 1847, the Gaslight and Coke and other Companies sprang up, each of them supplying the Metropolis with gas. Several Companies between those years were in existence, competing against each other; and in several instances there were several mains in one street, and consumers were able to buy from whichever Company they pleased at the lowest price, and make the best bargain they could. Consequently, between those dates there was competition, and some protection for the consumers. In 1847, Parliament fixed the maximum dividend of the Gas Companies at 10 per cent. This not only applied to the Metropolitan Gas Companies, but to those in existence throughout the country. From 1847 to 1860, the Metropolitan Gas Companies carried on a process of amalgamation and districting; dividing certain districts of London between themselves, and thereby converting into a huge monopoly what had hitherto been a matter of competition between them. This monopoly and this districting-out of various parts of London was legalized by Parliament in 1860; and it might be said that the action of Parliament in sanctioning the withdrawal of competition in that year established a state of affairs which was very detrimental to the consumers, but which at the same time raised the Companies to great prosperity and affluence. On looking back, they found that it had been since 1860 that very large dividends had been payable, whereas prior to that time the Companies were more like struggling trading concerns. Since Parliament legalized the monopoly, under conditions which were then imposed, great discontent had reigned in London in reference to the charges made by the Companies; and they found to-day that they were still in an unsatisfactory position, even if they might not say in a more unsatisfactory position. One of the principal periods in the history of the gas question in London was that of the time of Mr. Cardwell's Committee in 1867, which placed on the parliamentary records for the first time the unfortunate position of the consumer. The Comptroller of the Council said on this subject in his report:* "The general conclusion at which the Committee of 1867 arrived was 'that the Act of 1860 and the arrangements which it sanctions have been eminently favourable to the Companies, while the interests of the consumer have been very inadequately protected.'" Mr. Cardwell's Committee recommended that there should be an amalgamation, under proper conditions, of some of the Companies then supplying the Metropolis, with a view of reducing expenditure and benefiting the consumers. The benefit to the consumers had been very slow in coming—in fact, it did not follow the report of that Committee, and had not arrived yet. But, having received the report, the consumers expected some benefit; and this not arriving it created again a great deal of dissatisfaction, which had been prevailing ever since. It prevailed to such an extent after the report of Mr. Cardwell's Committee, that in 1874 the Metropolitan Board of Works resolved to introduce three Bills—one for the purchase of the Companies, another for establishing an independent supply, and the third to subject the Companies to uniform and improved regulations. The prospect of these Bills was somewhat interfered with by the attitude of the Government with respect to the third Bill, subjecting the Companies to uniform and improved regulations. A letter from the Board of Trade rather ruined the prospects of that Bill passing. The Board of Trade said in their letter, speaking of the provisions contained in the Bill: "Such a provision appears to Her Majesty's Government to be a breach of the existing arrangements with the Companies, to which, as stated by the Chancellor of the Exchequer on the second reading of the Bill, they could not agree." Members would appreciate, when a public body had a Private Bill before a Committee in Parliament, what it meant when the Board of Trade sent a communication of that kind to the Committee. The result was that none of the Bills promoted by the Metropolitan Board in 1874 were passed. But the Bills seemed to have been made the basis of the sliding-scale arrangement. He supposed that to-day they were face to face with the situation which had arisen out of the sliding-scale arrangement which was made the following session to that in which the Metropolitan Board of Works had introduced their Bill. All the information they had in reference to the sliding-scale arrangement clearly indicated that it was the intention of Parliament to make the consumers of gas in London partners with the Gas Companies, and to protect and benefit them; whereas they had gone on now for 25 years, and instead of the consumers of gas in London being in any sense beneficial partners with the Gas Companies, or in any way protected or benefited, the consumer had had no benefit whatever, and he was still discontented, and justly so. On the other hand, the Companies had pocketed £3,500,000 in dividends over and above the 10 per cent. maximum which they were entitled to prior to the sliding-scale arrangement enacted in 1875; so that he thought they stood there that day justly discontented with the result of the introduction of the sliding-scale arrangement. It would thus be seen that the legislation of 1875-6 completely failed in its object, and they were face to face with the old difficulties in an aggravated form. This rather brought them down to the current events; and in dealing with the current events of this question, they might take their minds for the moment to the proceedings in Parliament in 1898. In that year, the Gaslight and Coke Company introduced a very important Bill into Parliament—a Bill for consolidating and converting their capital. The consumers of London, the Council, the local authorities, and the City Corporation felt that that was a time when the grievance under which London suffered should be brought forward, and that the Gaslight and Coke Company's Bill should be opposed until those grievances had been remedied. The proposal of the Company seemed very harmless at first sight; but yet at the same time it was very shrewd, because, whereas they were receiving a dividend of 10 per cent., the object of altering their capital was that it should appear in the newspapers and before the public that they were only receiving 4 per cent. This was rather a shrewd proceeding on their part. However, the Council petitioned against the Bill. They said—

> The Gaslight and Coke Company have been until lately charging 2s. 10d. per 1000 cubic feet for gas supplied throughout the greater part of their district—viz., all that part of London which is north of the River Thames—as against 2s. 3d. charged by the South Metropolitan Gas Company, and have recently increased their charge to 3s. per 1000 cubic feet; while they charge 2s. 3d. only (the same as the South Metropolitan Company) on the south side of the river. The "standard price" of the South Metropolitan Gas Company is 3s. 6d., and that of the Gaslight and Coke Company is 3s. 9d.
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> This inequality of charge has always been considered unfair to the northern districts of London; and this unfairness has come recently into greater prominence in consequence of the rise which the Gaslight and Coke Company have made in their charge for gas.
>
> Your Petitioners humbly submit that the whole circumstances relating to the charge made for the supply of gas in London by this Company, as compared with the South Metropolitan Gas Company, require consideration, and they submit that the powers and concessions now sought by the Company should not be granted; or that, if granted, they should be subject to a condition that the Company should make an adequate reduction in the price charged by them for gas on the north side of the River Thames.

In the Council's opposition to the Bill, they had the support of the local authorities, and unanimity existed throughout the Metropolis. There was a conference held in the Holborn Town Hall, at which it was resolved to support the petition of the Council. However, the Bill passed. Parliament was not persuaded by the opposition of the gas consumers of London or by the Council, and the Bill became law. As a result of the Bill going through, Mr. Cohen, a member of the Council and a member of Parliament, moved and secured the appointment of a Select Committee to deal with the London Gas Question. The Council, with the assistance of the local authorities, presented the case against the Gas Companies on behalf of the consumers; and he thought they all felt that the report of the Select Committee, dated the 24th of July, 1899, was a very important document, and a very important report in assisting them in dealing with the question at the present time. That it was a grave indictment against the Gaslight and Coke Company, he thought they must all admit; and they must all feel that there was a great deal of force in the indictment which had been made against the Gaslight and Coke Company by the Select Committee. They reported principally that the high price charged by the Gaslight and Coke Company was due to mismanagement. In reference to this particular charge against the Gaslight and Coke Company, it was far more serious than it seemed on the face of it, when they remembered that the whole of the powers were granted to the Company on the clear and distinct understanding that they should have those powers providing they exercised due care and management in the undertaking. And now to be told, in July, 1899, by a responsible Committee of Parliament, that the high charges and the position which the Gaslight and Coke Company found themselves in were due to mismanagement was a very serious matter—indeed, so serious that it was evident someone must, and would have to, suffer as the result of the mismanagement. It seemed to him a very important question for them to consider—for London and Parliament to consider—that if someone had to suffer in consequence of this management, who was it that should suffer? It was perfectly evident that in the past, although there had been this mismanagement, it had not been the Companies who had suffered, because they had continued to receive 10 per cent., and in some cases more; and it would be only fair of Parliament to consider whether some of the responsibility at all events, and some of the consequences of this mismanagement, should not fall upon the shoulders of those who were responsible for the present state of affairs. It was rather unfortunate for London that the standard price regulating the sliding-scale was fixed at a time when the price of coal in London was almost at famine prices. In 1873, the price of coal was very similar to what it had been recently, and to what it was now. In 1875-6, it had not reached a normal state; and at that particular period the standard price was fixed. Since then, the Gas Companies had had the great advantage of cheap coal, and they had had the great advantage of receiving a much larger income from their bye-products; and though it was the intention of Parliament that the consumers should benefit, yet the consumers had had no benefit whatever. He thought they would feel that the time had arrived for a revision of the sliding-scale and dividend arrangement. It was quite clear that, since 1847 down to the present time, when Bills had been before Parliament dealing with this matter, the consumers had been outmanœuvred on each occasion. The Companies had succeeded in getting their Bills in reference to the consolidation and conversion of their capital, and in having their monopoly legalized. But in the sessions of 1899 and 1900, the Gas Companies had not been so fortunate; and he thought therein lay their hope, because it was indicated at the last half-

* The report referred to was noticed in the "Journal" for July 17 last (p. 169).

yearly meeting of the Gaslight and Coke Company that they would in all probability have to come to Parliament in the ensuing session. As Parliament began to realize the true position of affairs, and refused to pass the Gaslight and Coke Company's Bill in the sessions of 1899 and 1900, there was hope that, by formulating their proposals and by acting unitedly in the matter, they might be able to obtain some redress from Parliament when the Company again came for fresh concessions. They should be able to emphasize, at a conference of this kind, that they had a right to expect from Parliament a redress of the grievances of the consumers—at all events, on the north of the Thames. He did not know that he need refer to the Bills which did pass last session—the Bill of the South Metropolitan Gas Company and the Bill of the London County Council—but he might make one reference to the Bill of the South Metropolitan Company, which he thought was a very important one, wherein they asked to be empowered to take over the works of the Gaslight Company south of the Thames. He took it that they had no objection in principle to the transfer to the South Metropolitan Gas Company of these particular works; but there were two questions of great importance connected with the transfer: First, there was the question of new capital. It was evident that the Gaslight and Coke Company could not get on without more capital; and the Council's object was to make them come to Parliament for capital, so that they could lay their case before Parliament. But if the Gaslight and Coke Company sold their works south of the Thames to the South Metropolitan Gas Company, and got nearly £1,000,000 for them, it might keep them out of Parliament for several years to come, and prevent the case of the consumers being brought before Parliament. He thought this was a very important matter which they should resist, while they did not object to the principle of the transfer. Then there was the other point, and that was the question of the price of public lighting north of the Thames. The Gaslight and Coke Company were compelled to supply gas for public lighting at the same price as they charged their lowest customer; and as on the south of the Thames they only charged the same price as the South Metropolitan Gas Company, the local authorities north of the Thames only paid this for their street lighting, and there would be the danger of losing the advantage unless some protection were secured. This brought him to another point where there was a new danger—a new danger arising out of the South Metropolitan Gas Company's Act of last session. By it, the Company obtained the sanction of Parliament to lower their candle power for their quality of gas from 16 to 15; so that next year they could reduce their candle power to 15, and a little later on further reduce it to 14. This was very important, because the provision which compelled the Gaslight and Coke Company to supply gas for public lighting at the same price as they charged their lowest customers said that it should be for a similar quality of gas; and if they could make out that they were not supplying a similar quality of gas—because the South Metropolitan Gas Company would be making gas in the future of only 15 or 14 candle power—they might lose the benefit of the provision which the people north of the Thames had had, by the Bill of last session, carried by the South Metropolitan Gas Company. This he hoped the conference would not lose sight of in any decisions they might come to. It was very unfortunate, he thought, for London that the Council's Portable Photometer Bill was rejected by Parliament. He was quite sure that anyone who followed the matter before the House would agree that the officers of the Council placed a very strong case before Parliament; and, for his part, he could not quite appreciate the grounds upon which Parliament rejected the Bill, because it did seem strange that they should be unable to test the quality of gas as it was supplied to the various consumers in the Metropolis, and only be enabled to test the gas by giving many hours' notice to the Gas Company and at special points—particularly as the Council had found out by experience, and by testing, that the quality of gas was very inferior when it arrived at the houses of the consumers. It was clear that they had ample material for discussion. He could only express the hope that the conference would propound a policy on which all London could unite, and that the result might be that Parliament would afford the consumers that statutory protection to which they were entitled.

Mr. R. Melvill Beachcroft (London County Council) asked, as a matter of information, whether the Corporation of London were holding a conference of a similar kind.

The Chairman said he believed that there was a conference going to be held by the City Corporation on Oct. 31; but he understood from Mr. Haward, who had seen the City people, that it was only with the object of strengthening the hands of this conference, or any other steps which might be taken with this object.

Mr. Trenner (Holborn), with the view of giving effect, if possible, to one of the recommendations of the Select Committee, had prepared the following resolution: "With the view of giving effect to one of the recommendations of the Select Committee, a sinking fund shall be provided to redeem the obsolete or unremunerative capital of the Gas Companies by a reduction of dividend set aside for that purpose." Former conferences had been held, and the grievances under which the consumers were labouring were quite manifest at the present stage. They had got beyond airing a grievance; and the question now was how far this grievance could be remedied. One of the reasons given by the Gaslight and Coke Company why the price of gas north of the Thames was dearer was because of the large amount of capital which was in their undertaking. Of course, they were entitled to pay 10 per cent. at the standard rate; and if 10 per cent. had been paid also upon a large amount of obsolete and unremunerative capital, that seemed to him to be nothing short of a scandal, and a matter that ought to be at once dealt with with the view of remedying it. It did seem to him at the present day that 10 per cent. on the ordinary or productive capital was in itself a very high rate of interest; but when they had to pay this percentage on obsolete capital, then he said that it was a matter which might well be looked into with a view of remedying the evil. It transpired that there was a considerable amount of obsolete capital in this case. In the large amount of capital of something like £25,000,000, there was a very considerable amount which was obsolete capital. This was proved by the evidence. In fact, they had the report of the Select Committee to the effect that some steps should be taken to redeem this unproductive capital. Now he thought they might very well have arranged some plan by which, instead of this £3,500,000 which they had taken over and above the statutory 10 per cent.—this quarter per cent. extra, to be paid on every reduction of a penny in the price—going into the pockets of the shareholders, it should have been set aside as a sinking fund for the redemption of obsolete capital; then at the present day both the shareholders and the gas consumers would have been deriving the benefit of it. It must be obvious that if they could reduce the capital by such an amount, they were taking a step towards the reduction of the price of gas.

Mr. Colley (Hampstead) asked what was this unproductive capital.

Mr. Trenner replied that there was a very considerable amount of money invested during past years in machinery which later on was superseded by new machinery, and on works erected in certain localities which were afterwards superseded when the Companies found they could manufacture more economically in other localities. Consequently the expenses of machinery and works which were erected in various parts necessarily became obsolete when the works were transferred to other localities.. This amount of money still figured in the capital, and was obsolete capital. It amounted to some millions of pounds.

Mr. Beachcroft suggested that it would be more convenient if they took the recommendations of the Select Committee and treated them *seriatim*, and saw whether they could not follow them out by some resolutions of the conference.

The Chairman remarked that it was a very difficult matter to give a lead to a conference of this kind; but the Comptroller of the Council had suggested one resolution which might meet the views of the conference: "That, in the opinion of this conference, the time has arrived when the sliding-scale of price and dividend as applied to the Metropolitan Gas Companies in 1875-76 needs revision in the interests of the gas consumers." It would be rather useful if they could have some expression of opinion from a representative conference such as this, which would strengthen the hands of anyone who had in the ensuing session of Parliament to combat any of the Bills promoted by the Companies, or to lay this question before Parliament.

Earl Russell (London County Council) inquired the reason why Parliament reduced the standard of illuminating power. He understood the enrichment of gas was not done nowadays by the use of cannel coal as it used to be, but by the use of oil, and that the process was very much cheaper than it was.

The Chairman replied that the Companies claimed that it cost more than it was worth to the consumer to add the extra candle power; and that if they were in future enabled by statute to reduce it, they would be able to supply the gas very much cheaper. Of course, on the other hand, it was contended that this was only a clever move on the part of the Gas Companies, and the Chemist of the Council disputed the contention. This was the contention that prevailed, he thought, before Parliament.

Mr. Hale (Kensington) moved the following resolution: "That in the opinion of this conference the time has arrived when the sliding-scale of price and dividend as applied to the Metropolitan Gas Companies in 1875-76 needs revision in the interests of the gas consumers." There was not the least doubt that they were in rather an awkward predicament. The interests of the gas consumers had been neglected right away from the year 1860. This being the case, he supposed first one Government and then another had passed Bills that had enabled the Companies to obtain the position which they had that day, and, of course, which they believed, living north of the Thames, worked greatly to their disadvantage, inasmuch as they had to pay considerably more for their gas in the north than they did in the south, and he did not think this ought to be. Therefore they had a very strong feeling in regard to the matter. He quite agreed that they would have very great difficulty in getting justice from the Gas Companies.

Mr. Bruce Johnston (Kensington) seconded the resolution.

Mr. Trenner remarked that, while no one could possibly object to a resolution of the kind, yet it did not seem to give them any practical step forward. It was simply a resolution that the time had arrived when the sliding-scale should be revised. But Parliament, or the Select Committee, had already recommended this; and therefore they were simply endorsing what had been said by the Select Committee, but taking no practical step in order to bring it about. He failed to see that by passing a resolution to say "the time has arrived," in face of the recommendation of the Select Committee, "that it is desirable" that it should be done, that they were getting any more forward on practical ground. Therefore they should discuss that, and possibly pass it as a pious resolution. But what then? Having passed the resolution, they ought to take some step to give practical effect to it; and that was the reason why he should like to see the resolution, to serve perhaps as the basis of discussion with a little more practical effect with it than this resolution would have on the face of it.

Mr. Wallace (Camberwell) was not in opposition to the motion at all; but he thought the time had arrived when they ought to understand the difficulty of the consumers in the north, and the advantages which the consumers in the south possessed. To practical men, it seemed that the difference was between a well-managed business and a badly-managed business. They would like to hear those gentlemen who understood all about gas tell them how this difficulty was to be surmounted in dealing with the Companies. He yielded to no one in the desire to see the public protected; but they could not rush against the Companies, if they passed a resolution like this, unless they knew what they meant and they meant what they said. The South Metropolitan Gas Company, who supplied his parish, were under the able management—and he said "able" with confidence—of Mr. George Livesey, and they were doing marvellous things in the way of management; and if there was bad management, as the Chairman suggested, in the north of London, he could not see how they were going to deal with it until they dealt with the management. He did not know whether they would say that the time for making gas might cease—that the time had arrived when they ought probably to consider the larger question as to whether the County Council should not establish some very large generating stations throughout London, and let them out to local parishes for the purpose of electric lighting.

Sir Albert Rollit, M.P., said that upon the resolution which had just been proposed to the conference there would be no real division of opinion. But it seemed to him that they should do the best service to the case they had in hand, if they availed themselves of the formulated report of the Committee as a basis, confirmed as it was by the opportunity which the Committee had had of hearing practical evidence

upon the subject. It seemed to him that if they did this, they would arrive at a point ultimately in which they would place themselves in the best position for doing what they could in Parliament; because, of course, the House of Commons would have regard to the report of the Committee who had been appointed by the House, and he did not hesitate to say also that Parliament would have regard to the conclusions of this representative conference, especially in so far as they reinforced the report of the Committee. After they had affirmed, as he hoped they would, the main findings of the Select Committee, they might add supplementary resolutions upon possible points of difference from them, and with the view of modifying perhaps in some respects, in detail at any rate, the conclusions of the Committee. They should take No. 1 first, dealing with the question of revision, and incidentally with the question of the differential treatment of North and South London; and possibly at the same time they might consider whether they quite agreed with the introductory words of the paragraph inserted by the Committee—namely, that they should necessarily await the time when circumstances forced the Companies to come to Parliament. (Hear, hear.) He was not disposed to think that this was a necessary provision. Certainly, if it were true that by means of a sale and purchase the Gaslight and Coke Company, who were the chief offenders, and under the report of the Committee the principal convicts, might escape the consequences of conviction by an arrangement under which they obtained money *aliundi* instead of having to resort to Parliament, these words became of material consequence in deciding whether they should necessarily await any such application.

Mr. Hale said it was more with the object of starting business that his resolution was moved; and he should withdraw it.

On the motion of Mr. Colley seconded by Mr. Cox (Strand Board) it was agreed that the recommendations of the Select Committee should be taken as the basis of the conference.

Mr. Trenner said he felt all along that "Why should London wait?" applied with very great force to Recommendation No. 1; and in fact in Holborn they had considered the question of memorializing Parliament on the very lines that Sir Albert Rollit had referred to—namely, that those lines in the beginning of Recommendation No. 1 should be deleted: "That whenever any of the Metropolitan Gas Companies again come to Parliament for an extension or alteration of their capital powers." It seemed to him that if a grievance did exist—and it was admitted by everyone that it did exist—there was really not any fair or proper reason why they should have to wait until the Companies came before Parliament. If they knew that by coming before Parliament they would have, so to speak, to climb down from their pedestal, they would certainly, by hook or by crook, endeavour to avoid coming as long as they could. He moved to omit from Recommendation No. 1 the reference to waiting until the Companies went before Parliament, and further that ¼ per cent. dividend over and above the 10 per cent. should be apportioned towards the reduction of obsolete capital.

Mr. Rumball (St. Luke's) seconded.

After some discussion, Mr. Trenner withdrew the portion of his, amendment dealing with the reduction of obsolete capital.

Mr. Colley thought it would very much strengthen the hands of the Committee of Parliament, or any Member of Parliament who might bring it forward, if the conference passed separate resolutions, and did not take those of the Select Committee, except as a basis to go upon.

Mr. Henry Mills (Islington) observed that, while they were unanimously of opinion that the words "whenever any of the Metropolitan Gas Companies again come to Parliament for an extension or alteration of their capital powers" should be deleted from any resolution they passed that afternoon, it occurred to him, as one of the consumers on the north of the Thames, that they were very interested to know what they proposed to put in instead of those words in order to bring this revision about. As far as he had been able to consider the question, it seemed to him that Parliament would not do anything until it was asked; and somebody must make application to Parliament, because, if a number of resolutions were passed there, they would go away perhaps with the gratifying feeling that something had been done, but after all not having left the thing in the practical shape that every representative of every local authority in London desired to see it placed in as speedily as possible. Therefore it occurred to him, and he made the suggestion with very great diffidence to the conference, that the more appropriate form of resolution would be that they should ask the London County Council, and if needs be the City Corporation as well, to immediately take such steps as they thought necessary to bring about the revision of the sliding-scale, and then the other words of the resolution would sum up the matter appropriately.

Mr. A. C. Morton (City Corporation) saw great difficulty in voting for either the amendment or the motion, because, after they had done it, they would have tied their hands. They would probably get nothing. What they really wanted in North London was to get rid of the extra 8½d. which was charged by the Gaslight and Coke Company. If there was no other way of getting relief, they must ask Parliament, through the proper authorities, to give them relief. There was no doubt at all they had been saddled in London with a very great monopoly, an all-powerful monopoly. They could dictate, under the sliding-scale, what they should pay for gas, to a very large extent. No doubt it was the result of bad management on the part of the Gaslight and Coke Company that gas was dearer on the north side of London; but it ought also to be borne in mind that it was partly owing to the extra good management of the South Metropolitan Gas Company that they were enabled to sell gas cheaper. He was not going to be any party to carrying the resolution before them, because that would merely tie them up to going for a revision of the sliding-scale, which might possibly reduce it 1d. or 2d. on the north side, but would not reduce it 8½d.

Mr. Thomas Lough, M.P., remarked that there was a difficulty in following the suggestions which had just been thrown out by the representatives of the Corporation. It sounded very simple to say that they ought to pass a resolution that the price of gas should be the same on the north side of the Thames as in other parts of London; but it was extremely difficult to do so, because the body who supplied the south had got statutory powers and a different standard price from the parallel body in the north, and there were other divergences in the Metropolis. Passing to the main resolution before them, it seemed to him that the conference was in a little difficulty. In order to get rid of the first words of the first recommendation of the Committee, they were asked to swallow the whole of the first recommendation. That was a tall order; they ought to draw a line. What the mover of the present motion wanted to do was to get rid of the words that they were to wait until some of the Gas Companies came before Parliament. To get rid of these words would be a very proper first step for them to take. If in order to get rid of the first words, they swallowed the whole of the resolution, they were tied to expressing the opinion that 3s. 3d. would be a desirable standard price to fix. He did not think this would be a desirable resolution to come to at all. Although he was a member of the Select Committee, he had on those Select Committees to accept compromises. And 3s. 3d. was not a low standard price, it was rather a high standard price; and if a big dividend like 10 per cent. was to be paid, they might fix a lower price than that. But he only said this suggestively, in order to point out the difficulty of their swallowing the whole of the first recommendation hastily without studying every part of it, as the conference was now very rightly studying the two first lines. He would suggest that they should deal with the two first lines only, and declare that the time had come when a reduction of the standard price, and an alteration in the sliding-scale, should take place throughout London. If they started with that, and if the conference were able to agree with that, he was sure it would strengthen the hands of Parliament in dealing with the subject hereafter; and then they might consider afterwards what ought to be the standard price, and they might also consider whether the important recommendations in the last four lines of Paragraph 1 were necessary or not. He would be glad to move as an amendment: "That, in the opinion of this conference, the time has come when a revision of the sliding-scale should take place, and the standard price of gas throughout the Metropolis should be reduced."

Mr. Beachcroft suggested that the following words might be almost better: "That, in the opinion of this conference, the consumers should not be required to wait until the Metropolitan Gas Companies come to Parliament for further powers before obtaining revision of the sliding-scale, and accordingly express the hope that the London County Council and the Corporation of London will take steps to bring the matter before Parliament."

Mr. Lough said he preferred his own words.

Mr. Matthews (St. Pancras) said the question before them, if he understood it rightly, was the deleting of these two lines. If they did so, he took it they should call upon the London County Council and the Corporation of the City of London to lodge a Bill in Parliament next year for the revision of the sliding-scale, with the object of lowering the standard of the different Companies. In his opening address, the Chairman told them that the price of coal when the standard of 3s. 9d. was fixed was almost the same as it was now. If the Committee of the House of Commons, guided by experts, found that, with the price of coal as it was now, 3s. 9d. was a proper standard to fix, was this the moment to choose when they should ask Parliament to lower the sliding-scale? Unless they could have some knowledge that the price of coal would be lower next session, were they justified in asking the County Council to choose this time to ask for the scale to be revised?

Sir Albert Rollit asked what was the motion at present before the conference, and suggested that their clear course, if they meant to get to business, was to declare first what they wanted and afterwards how they wanted it—by what means, and when. He did not depart from what he suggested—that the recommendations of the Select Committee gave the proper line to take. They might be cut up. For instance, take the first. They did not want certain introductory words at all for the purpose of their discussion. It was sufficient to leave them out, and to move the other words of the recommendation, that a revision of the sliding-scale should take place, and that the standard price should be reduced. This was one step forward. Whether it should be 3s. 3d., or what else, was the next step; and, finally, they wanted to come back to the introductory words, which, he thought, were somewhat misplaced, and to say that at the first opportunity, whether afforded by the introduction of Bills by the Companies or upon the initiative of the County Council, if that was recommended, means be taken to carry forward what they had declared to be necessary. Therefore he suggested, with diffidence, that the proper resolution would be culled from the first recommendation, that a revision of the sliding-scale should take place and that the standard price should be reduced; and afterwards let them consider details of price, and ultimately come back to the first part of the recommendation by saying how and when they wanted it.

Several Representatives: Agreed.

Mr. Gibson was quite prepared to second this as being a practical method of getting to the end.

Mr. Lough thought it would be better to proceed in the spirit of Sir Albert Rollit's suggestion, but adopt better words, the responsibility for which the conference would take upon their own shoulders. These words seemed to him more desirable: "That, in the opinion of this conference, the time has arrived when the sliding-scale of price and dividend as applied to the Metropolitan Gas Companies in 1875-6 needs revision in the interests of the gas consumers."

Mr. Wallace seconded; and Sir A. Rollit accepted Mr. Lough's form.

Mr. Munden (Paddington) wished to move an amendment, to take the feeling of the conference on the case of the London County Council proceeding to purchase the London Gas Companies. He thought they would get no permanent benefit, from a consumer's standpoint, until the London County Council or some other body proceeded to buy up the Gas Companies. His amendment was: "That it be recommended to the London County Council to take into consideration the advisability of proceeding with a Bill for purchase."

The amendment was not seconded.

Mr. Howlett (Lambeth) considered that they ought to differentiate a little. He came from the south side of the Thames; and there they had no fault to find with the Gas Company. But he wanted to see that they did not use a two-edged sword, or they would hurt the people, and certainly not benefit them to any extent. The history of the South Metropolitan Gas Company was that whenever possible they had reduced the price of gas by good management. And he differed from the Chairman in his remarks that the sliding-scale had not been a benefit. He thought it had distinctly been a benefit to the consumer. If the London County Council were to buy up the South Metropolitan Gas Company, and run it upon municipal lines, that would be all right; but he was afraid they would be losers in the south, for he did not think the concern would be

managed as well as it was being managed at present. The feeling he had in the matter was that they in the south had every reason to be thankful to the Gas Company for the honest way in which they had treated them all through. Whatever complaints they had on the north side, he did not want them to pass a resolution advising Parliament that, while they remedied their own defects, they should injure the Company who had really done their duty all the way through.

Mr. LOUGH's motion was carried unanimously.

Mr. KERSHAW moved, on Recommendation No. 2 of the Select Committee's recommendations: "That this conference approves of the transfer, under proper conditions, to the South Metropolitan Gas Company of that portion of the area of the Gaslight and Coke Company situated south of the Thames, as recommended by the Select Committee of the House of Commons last year; provided that the Gaslight and Coke Company shall be required to make some equitable rebate on the ordinary charge to local authorities in respect of gas supplied for public purposes, in lieu of the existing arrangement provided for in the Amalgamation Scheme of 1883." This seemed to him to meet the whole case as far as the amalgamation of the two areas was concerned. At first, he thought of suggesting that they should oppose amalgamation entirely; but this did not appeal to some members of the conference as being a wise course, inasmuch as it was desirable in many other respects that the amalgamation should take place. But it would be very unfair to the consumers north of the Thames—he did not speak particularly for Shoreditch, where they had an electric light installation which deprived the Gas Company of some £6000 or £7000 a year that they previously had from the funds of the borough—and also the local authorities, if this amalgamation took place, that they should then be in the position of ordinary consumers, and should have to pay the full rate for gas charged at the present time, whereas under the Amalgamation Scheme of 1883 it was well known that they had the privilege north of the Thames of having gas for public purposes at the same price as the lowest charge made by the South Metropolitan Company. Therefore if that Company absorbed the portion of the Gaslight and Coke Company's area south of the Thames, it would necessarily follow that the price of gas to the local authorities north of the river would be the current rate.

Mr. COX, in seconding, said that if the South Metropolitan Gas Company were allowed to acquire the interest of the Gaslight and Coke Company on the south side, to the Strand district alone it would mean an increase of £2100 a year.

Mr. TRENNER opposed the resolution as drafted, not because he was against the principle of the purchase—or rather the sale—from the one Company to the other, but because he thought the resolution said too much; and by saying so much it rather narrowed its scope and its usefulness. He therefore moved, as an amendment, to leave out all the details which had been specified in regard to conditions, and simply say that the sale should take place under proper safeguards of the public interest.

Mr. WALLACE said the desire of the conference, it seemed to him, was that the sale should not take place unless they had an opportunity of being heard by Parliament; and yet it had been suggested that they should allow it to be effected. They should not allow any private bargaining between the two Companies, and yet they were dropping into making a bargain which would not allow them to be heard. It was better to rely on their powers or any powers they got from Parliament to regulate the Bill when it came before the Legislature.

Mr. WILKINS (Islington) seconded Mr. Trenner's amendment.

Mr. MATTHEWS hoped the conference would not deal with Paragraph 2 in the manner provided by either the motion or the amendment. If they on the north of the Thames were in any way in a good position, it was because the Gaslight and Coke Company owned a district on the south side of the river; to this only did they owe any reduction in the charge for public lighting the Company might make. Therefore, for them to put a handle in the hands of the Company to go to Parliament and say, "Not only do the Select Committee recommend that this district should be transferred to us, but the conference called by the London County Council in the interests of the consumers also recommended that the district should be transferred to us," was the most suicidal proposition he had ever heard brought before any public body. The Parliamentary Committee were quite in order in making re arrangements of London; but this re-arrangement was, in his opinion, detrimental to the consumer. The proper course for the conference, if they had the interests of the consumers on the north of the Thames in their mind, was certainly not to deal with the question of transferring the southern district to the South Metropolitan Gas Company.

Mr. MORTON agreed with these remarks. He did not think they ought to pass any resolution in favour of allowing one Company to sell, and the other to buy, the portion of the area in question. He was quite satisfied that the House of Commons Committee, when they passed Paragraph 2, did not really understand the question—he said it deliberately—or the benefit the north side derived by the terms of the Amalgamation Scheme of 1883. As a matter of fact, the loss would be, at the present moment, about £30,000, without any equivalent. It would mean practically the loss of a halfpenny rate on the north side of London; and they ought to be exceedingly careful how they dealt with it. He was very glad to know that the Corporation of London, having got all the local authorities on the north side of the Thames to send Counsel to oppose the purchase, succeeded in getting the clause struck out altogether; and therefore it would be a most suicidal course for any conference of London local authorities to express any definite opinion about purchase. If they wanted to do so, let them say it ought not to be done except on conditions to be approved by the authorities. He did not want to move "the previous question" in the matter, because he thought it would be much better for them to be unanimous; and perhaps honourable gentlemen would withdraw all their resolutions with regard thereto, and really deal with what Sir Albert Rollit had suggested they were to deal with after passing the general resolution saying what they wanted.

Mr. LOUGH said that he was in favour of the original motion, and did not agree with the last two speakers. It had been stated that any advantage they derived on the north of the Thames they obtained because the Gaslight and Coke Company had the small area on the south. This was a very superficial way of looking at it. They derived no advantage whatever on the north side. As matter of fact, what took place was this: In the area belonging to the Gaslight and Coke Company on the south side of the river, gas was sold under cost price. He believed it was sold at 3d., or at any rate at 2d., per 1000 cubic feet under cost price; and at whose expense? At the expense of the consumers on the north side. If this selling under cost price were stopped, it would be a great saving to all the people in North London. The consumers there enabled the Company to pay 12½ per cent., 12 per cent., or 13 per cent. on the capital they used unproductively south of the river; and therefore they had no advantage from the arrangement. As a matter of fact, the people on the north side subscribed £80,000 a year in order that certain persons in the south and some local authorities in the north might enjoy cheap gas.

Mr. MORTON: We do not admit that.

Mr. LOUGH said of course they did not. It would be very foolish to admit anything anybody said on the other side; but an impartial authority might accept it. Therefore when the mover stated that they had a great advantage in the north, he also mentioned what the advantage was. He said that in the reduction in the price of public lighting they saved £30,000 a year. And they did it at an expense of £80,000. This £30,000 represented about 0·33d. per 1000 cubic feet of gas all over the north; but the £80,000 represented 1d. per 1000 cubic feet. If, then, the £80,000 was too high, it was quite certain that they paid a great deal more for the price of their gas than they got back in the cheapness of public lighting. Therefore he recommended the conference not hastily to throw over or to accept the theory that the Committee did not examine this question. The more it was examined, the more it would be found that there was no relief to the consumers in the north from this area belonging to the Gaslight and Coke Company in the south, but rather an additional burden. The words at the end of the resolution surely protected every legitimate interest, and they might adopt it with the addition which had been made as the Chairman had suggested.

Mr. HOWLETT held that the facts were substantially as Mr. Lough had suggested. The Gaslight and Coke Company lost money to the tune of something like £80,000 by manufacturing gas on the south side of the Thames; and, owing to the position they were in, they could not reduce the price of gas. The South Metropolitan Company were not at all anxious to take these works; the initiative came from the Gaslight and Coke Company. It was the Parliamentary Committee who suggested it; and the South Metropolitan Company said: "Well, we will take it at a fair price between ourselves." The whole thing would have gone through, but the House of Lords refused to pass the proposal because the Gaslight and Coke Company would then have had £800,000 or £900,000, and probably would have been enabled to keep out of Parliament for three or four years before they applied for any more capital. This was the only reason why the proposal was not agreed to. It passed the Commons and went through; but the House of Lords took the view of it that the Company had not treated the public well, and therefore they would not put any handle in their hands, so that they should not need to come before Parliament soon. But as far as the loss on public lighting was concerned, Mr. Morton said they lost £30,000 a year. He could assure him they would gain a very great deal more by passing these works entirely over to the other Company. He had no doubt of it in his own mind that when Parliament discussed this matter again they would take pretty good care that the public were safeguarded in the matter by proper conditions being insisted on.

Mr. MORTON wanted to put this proposition: If this at the present moment was a loss to the Gaslight and Coke Company of £80,000 per annum, how was it that they were to get £900,000 for the loss? That was the selling price of a loss.

Mr. RAYNOR (Battersea) hoped they would leave No. 2 clause alone. They were rather narrowing the issue. It appeared to him that there was somewhat of a fight between North and South London. Whatever they did here as a conference, he hoped would be done for the good of the whole of London.

Sir A. ROLLIT said there was one clear reason why they should retain the South London jurisdiction, if he might so speak, and that was that it was the standard price for public lighting in North London, and so far effected a very considerable reduction. But, except for this reason, they really had nothing to do with the internal affairs of the Companies—the question of amalgamation; and he ventured to say this: That, as the matter appeared debatable, and as they were not very clear whether it would be an advantage generally or not that the transfer should take place, the form of the resolution should be this: "That if the second recommendation of the Select Committee is adopted—namely, 'That the area south of the River Thames, at present part of the district of the Gaslight and Coke Company, acquired by them from the absorption of the London Gas Company in 1883, should be transferred from the Gaslight and Coke Company to the South Metropolitan Gas Company, fair and reasonable price being paid by the latter to the former Company for their property in the southern area,' it should be on proper conditions, and subject to safeguards for the protection of the public."

Mr. KERSHAW withdrew his motion in favour of that of Sir Albert Rollit; and Mr. Trenner's amendment was negatived on a show of hands—only four supporting it.

Mr. RUMBALL remarked that London would have to buy all these monopolies. They might delay the purchase as long as they liked; but they would have to at the finish. The longer they delayed, the bigger the price they would have to pay. They allowed the Companies to amalgamate until there was no competition whatever. The only sale they were agreed upon was a sale to the London County Council, or that some other body should buy the works for London—the City. It was suggested in the Council some time ago, with regard to the water question, that there should be a Water Commission. He was not against a Gas Commission buying on behalf of London; and the who'e of the interest and profit should go in relief of the rates of London. That was what he was in favour of, and he moved it as an amendment.

Mr. MUNDEN seconded.

Mr. TRENNER maintained that the transfer would benefit both South London and North London. The South London Company were certainly selling gas at a very good profit, although at a much lower rate; and if they had a much larger number of customers, did anyone imagine that they would not be able to make some profit working on the same lines as they had hitherto done?

Mr. MATTHEWS said the Gaslight and Coke Company resented very much the introduction of the electric light into the streets. Therefore it was quite evident the figures were misleading, and they were not losing by selling gas in South London.

The amendment was negatived; and there voted: For the resolution, 24; against, 10; majority for, 14.

Sir Albert Rollit then moved, and it was agreed: "That the practice of the Gaslight and Coke Company in treating North and South London differentially, by charging consumers in North London 8½d. per 1000 cubic feet more than in South London, has no justification, and is a practice which ought to be redressed."

Mr. Colley moved, Mr. Watts seconded, and it was resolved—"That capital powers should not be granted to any Gas Company for more than five years."

Mr. Trenner suggested a resolution to endeavour to give some practical turn to Recommendation No. 5, because it simply said that an effort should be made by the Companies. If they did not make any effort, they stood where they were. They might have a resolution to the effect that a sinking fund should be provided out of dividends for this purpose. Altogether the obsolete capital was £1,500,000. If they were to pay 10 per cent. on the £1,500,000, they had at once the ratepayers saddled with £150,000, making up to the Company for paying dividend on obsolete capital. This represented 2d. per 1000 cubic feet. He did not commit himself to details as to where it was to come from, whether out of the surplus over and above the 10 per cent. dividend, or out of the 10 per cent.—9 per cent. going into their pockets, and 1 per cent. to the sinking fund; but he moved that a sinking fund be provided for the purpose of redeeming obsolete capital.

Mr. Physick (Marylebone) seconded.

On a show of hands, the resolution, in the following terms, was adopted: "That, with a view to giving effect to Recommendation No. 5 of the Select Committee, a sinking fund shall be provided for the purpose of redeeming obsolete capital by setting aside dividends."

Mr. Wilkins moved, but subsequently withdrew, the following motion: "That this conference requests the London County Council to promote a Bill to carry out the recommendations of the Select Committee, as set out on page 7 of the 'Memorandum' of the Council, with the modifications approved by this conference."

Mr. Kershaw moved, and Mr. Rumball seconded: "That this conference approves of the action of the London County Council in requesting the Board of Trade to institute an inquiry as to the cause of the persistent differences between the results of testing the illuminating power of gas supplied by the Metropolitan Gas Companies at prescribed testing-places, and of tests made with the portable photometer (of identical construction) of gas supplied to other buildings in the County of London."

Mr. Morton submitted that it was not in order to bring this before the conference at all, however good it might be.

The Chairman said if there was a fight which the County Council had been engaged in, it was in trying to strengthen the position of London as regards the quality of the gas and the testings which were made from time to time; and the hands of the Council would be very much strengthened by the conference passing such a resolution as that moved by Mr. Kershaw.

Mr. Howlett did not think the County Council had had a mandate upon this portable photometer business at all. It was not in the interests of the public in the slightest degree. The Bill passed by the House of Commons in favour of the South Metropolitan Gas Company was a much more sensible view to take of public gas lighting. He did not think the County Council had been well advised in this matter at all. He had not heard great complaints of the quality of the gas; and it was entirely a question of good and bad fittings. As a man in the street, he had never asked the London County Council to bring in this portable photometer. They had their testing-stations; and he thought there should be a give-and-take policy on this question. It was an irritant, and the public would have to pay for it.

Colonel Blair supported the last speaker. When the Council went against their ideas of fairness, the public rose against them. The Council had the right to test the public water that was supplied; but they did not test it in the dirty cistern at the top of the house. They tested it from the flowing main. So they ought to treat fairly with the Gas Companies. Testing gas at the dead-end of the pipe was unfair; so the Bill was thrown out of Parliament, simply because there was a feeling as to the unfairness of the matter. By all means test it at the flowing mains, wherever they wanted; and as to the 24 hours' notice, he believed the Companies would dispense with that.

The Chairman desired to put the conference right on the point raised by the last two speakers about the Council and testing gas. The Council went very carefully into the Bill and into its proposals before Parliament, to make it quite clear that there was no wish to test the gas at any old dead-end of a service-pipe, or at what would be parallel to a dirty cistern, because the Council were very careful to make their case to be that they could test only in such places, and under such conditions, as should be decided upon by the Gas Referees. The resolution was not committing the conference to everything that the Council might put in a Bill. It was committing the conference to an inquiry to be held by the Board of Trade into this question.

On a show of hands, there voted for the resolution 27, on the contrary 3.

Mr. Morton asked for a division, as he wanted it to appear that he did not vote at all.

The Chairman said they had not the machinery for a division; but the fact that Mr. Morton did not vote would be noted.

It was agreed that a copy of the resolutions passed be sent to the Corporation of the City of London, for their guidance at the conference that has been called by them. It was also agreed that copies be sent to the bodies represented at the conference.

A vote of thanks having been passed to the Chairman, the proceedings terminated.

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In a paragraph which appeared in the "Journal" for the 9th inst., it was stated that the Company which has been formed to acquire the undertaking of the Crawley Gas Company will also "carry on the business of an electric light supply company." We are asked to explain that the Company have no present intention of establishing electric light works; but, in the event of a demand for this illuminant arising, they will be prepared, having the power, to take steps to meet it, if thought desirable.

## DEVELOPING THE GAS INDUSTRY IN IRELAND.

Save in a few of the leading towns, the gas industry in Ireland appears to be in a dormant condition, and little notable progress is being made. For this state of things, want of capital is no doubt largely accountable; for without it economical methods of manufacture cannot be secured, and the efforts of managers to gain new business are necessarily cramped. A Company, which will be known as the Irish Provincial Gas Company, Limited (see p. 1046), has been formed for the purpose of taking over a number of concerns, and supplying to those which need it the means of development which they now lack. It is believed that, if raised to a good manufacturing status by the modernizing of the plant, and placed under a qualified, concentrated, and energetic management, these undertakings offer the substance upon which a sound, growing, and lucrative business may be cultivated. It is proposed to purchase twelve undertakings—the principal of which are Sligo, Mullingar, Newbridge, Longford, Ennis, Castlebar, and Naas; but in the case of Sligo, the Company have acquired, by letters of agreement from individual holders, sufficient shares in the concern to give them the full control of the business. In this town, the make of gas in 1898-9 was 27 million cubic feet. The new Company are taking over these various works at a price (£86,100) which, the Consulting Engineer (Mr. Percy Griffith, Assoc.M.Inst.C.E.) calculates, on the present profits, will yield 5½ per cent.; and by spending a comparatively small amount of capital in the improvement of the works and the extension of the distribution systems, and by reducing the price of gas and pushing the use of slot meters, stoves, and engines, he states that he is confident that the profits will rapidly advance up to 15 per cent. on the capital now being issued. It is intended, as soon as the present proposals have been consummated, to undertake the construction of new works at a number of places which Mr. Griffith has inspected, and found to be of a promising character—in fact, in his opinion, there is a large scope for the development of the gas industry in the small towns throughout Ireland. The promoters' profits are considered moderate, compared with what is usual in similar cases. The nominal capital of the Company is £160,000, of which £50,000 is 4½ per cent. first mortgage debenture stock. The present issue consists of this stock and 65,000 ordinary £1 shares—making together £115,000. The Trustees for the debenture holders are the Right Hon. Sir Thomas D. Pile, Bart., the Lord Mayor of Dublin, and Alderman W. F. Cotton, J.P., the Managing-Director of the Alliance and Dublin Consumers' Gas Company. The Directors are Messrs. W. R. Fenton, W. A. Wallis, J. W. Russell Wall, and C. B. Tully, the Engineer of the Sligo Gas Company, who will be Managing-Director of the new concern. The report of the Consulting Engineer on this enterprise has been fully endorsed by Mr. T. O. Paterson, M.Inst.C.E., of Birkenhead.

## CAPITAL REQUIREMENTS OF THE WELSBACH COMPANY.

A Meeting of the holders of preference stock in the Welsbach Incandescent Gas-Light Company was called for last Wednesday, at the Cannon Street Hotel, to consider, and, if approved, to ratify, an alteration in the Articles of Association, by striking out Articles 53 and 54, and substituting therefor one giving the Directors power to borrow and raise money in any manner and on any terms; mortgage or charge the whole or any part of the property of the Company, both present and future, including the uncalled capital for the time being; and create and issue debentures, debenture stock, bonds or other obligations, perpetual or otherwise, with or without any mortgage or charge on all or any part of such property and uncalled capital, provided that the Directors shall not, without the sanction of a general meeting, borrow or raise any sum of money which will make the amount of principal borrowed or raised, and then outstanding, exceed 25 per cent. of the issued capital for the time being, and that the amount of principal at any time secured by any mortgage or charge shall not exceed £250,000, unless with the sanction of an extraordinary resolution of the Company and the sanction of the holders of the issued preference stock.

The meeting was held in the Great Hall of the hotel. Long before the time appointed for the commencement of the proceedings, there was a constant stream of stock and share holders into the hall. But outside the entrance was a disconsolate group of Press men, who, contrary to all previous custom of the Company, were at first denied admission, on the ground that the preference shareholders' meeting, being a "class" one, would be private, but a subsequent extraordinary general meeting would be open for their attendance. However, by the kind offices of one or more shareholders, the prohibition was very soon withdrawn; and the reporters were admitted. The Chairman (Sir Henry Burdett, K.C.B.) wished it to be clearly understood that the question of the admission of the Press had never been considered in any definite sense. This being merely a "class" meeting, Press representatives were not invited to be present. But it was pointed out by a shareholder that there was an impression that the Board had vetoed the admission of the Press, as they were notified at the door that they would not be admitted. However, as it happened, nothing had been lost by the reporters, as, on then admission, they found that, although the hall was crowded, those present, with the proxies, only represented £900,000 of the million (two-thirds of the total) of preference stock required before the business could be proceeded with. At three o'clock, there still being about £50,000 short of the million, the Chairman declared the meeting adjourned for a week, and appealed to the stockholders to co-operate with the Board in then securing a quorum, present or by proxy. He explained that if there was not a quorum, the meeting would have to be dissolved; and the matter taken in hand *de novo*.

During the wait, the Chairman mentioned that he had received a telegram to the effect that the Auer electric lamp had been fixed in the Austrian pavilion at the Paris Exhibition. It had also been tested by the Emperor of Austria in his own private room; and His Majesty had expressed a wish, and given an order, that it should be installed in all his palaces throughout Austria. Sir Henry said he thought this was a fact that might interest the shareholders; and he gave it to them for what it was worth.

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## NAPHTHALENE.

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**£3 5s.**

**Net.**

**2½ per cent.**

**Cash Monthly.**

### Advantages.

**This Cleanser is thoroughly effective in removing Stoppages of all kinds, but in practice has been found to be particularly so in cases where Services are hoked with Naphthalene.**

**It is less expensive to Companies, as it overcomes the necessity for repeated operations; and further it reduces the inconvenience to Consumers to a minimum by more thoroughly cleansing the pipes than is done with simply an Air Blast.**

**It can, however, be used as an ordinary force-pump, without alteration, by simply omitting the charge.**

**It is light and compact.**

### INSTRUCTIONS FOR USE.

Unscrew the plug on the shoulder of the Pump, and pour in a charge of (say) from ¼ to ½ pint of Petroleum Spirit 680-700. Replace the plug, and proceed as with an ordinary Service Cleanser.

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Every Gas Engineer should see

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which are lighted with several 1000-Candle Lamps with High-Pressure Gas, under William Sugg's Patents.

*Vide* Leading Article in the "JOURNAL OF GAS LIGHTING," Oct. 16, 1900.

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A number of Installations in various parts of England and Abroad have been fitted up with excellent results.

# WILLIAM SUGG & CO., LIMITED,

ENGINEERS,

# WESTMINSTER.

A little later an Extraordinary General Meeting of the Company was held to consider a resolution in precisely the same terms as that already summarized. Sir HENRY BURDETT again presided.

The SECRETARY (Mr. Few) read the notice convening the meeting.

The CHAIRMAN, before moving the adoption of the resolution, said that, at the meeting of the preference shareholders, he was asked, and was now in a position to reply, how much preference stock was held by the Board. He found that the holding of the Board was as follows: Preference stock £20,255, ordinary stock £22,655, and deferred shares £14,188. Proceeding to the business before the meeting, he remarked that the explanatory circular which had been sent to the shareholders gave them pretty full particulars of the reasons why the Board decided to call the meeting. The facts were that the Articles of Association, as originally drawn up, gave power to borrow on security. It was intended, under Article 54, that such power to borrow on security should be conferred on the Board; but, in view of a recent decision, they were advised that power was not conferred, as it was intended to be, under that Article. The Articles of the Company were very carefully drawn, with the special object of protecting the interests of the preference shareholders; and this was the point which, in the resolution that was going to be submitted, had been duly borne in mind, and upheld by the Board in proposing to limit to £250,000 the borrowing powers on security which they asked for. There were great difficulties in the way of getting an alteration of the Articles of Association, because a general meeting was unable to alter them without the consent of the preference shareholders. A "class" meeting of the preference shareholders was called for that afternoon; but they failed to fulfil the conditions rendered necessary by the Articles of Association of obtaining a quorum to the extent of two-thirds of the whole of the preference stock. Failing to get a quorum at that meeting did not affect the present one, because the Company had the power, subject to the consent of the preference shareholders, to pass a resolution altering the Articles of Association; and this was what the Board proposed to ask the shareholders to agree to. It might be asked what the Board required the money for. A portion was needed for the increased output due to increased business; and it had been shown that this increase in the business rendered their manufacturing capacity inadequate, and so they would require new factory accommodation. On the formation of the Company, the arrangements provided for £100,000 as extra working capital. This extra £100,000 could be accounted for by the sum paid on account of the Kern and anti-vibrator patents, £63,000; outlay on premises and plant, after deducting the amount written off, £17,000; and increased stock-in-trade estimated at £20,000—making the total of £100,000. It would thus be seen that, at this important stage in the Company's career, when it was necessary to increase their trade to the utmost, they had no extra working capital available; the £100,000 provided having been expended in fixed assets to the amount of £80,000, and in increased stock to the extent of £20,000. This expenditure had no doubt added to the stability of the property. But it should be mentioned that, though the agreements for the purchase of the Kern burner patents were entered into by the Welsbach Company after the date of incorporation, the arrangements for acquiring the inventions had already been completed by their predecessors, and were referred to in the prospectus. Under such circumstances, the shareholders must see that it was highly desirable in the interests of the business that the powers sought should be granted. The Company probably never had a better chance of securing an extended trade than they had now. The figures showing the increase in the number of burners sold in the four months during which the reduced prices had been in force plainly indicated that the popular demand for the Welsbach light, now that it had been brought within the reach of a larger number of users who formerly hesitated on account of its initial cost, would spread still further, and take the Company a long way on towards the commercial footing which it had been so long desired it should obtain. Shareholders would assume enormous responsibility if they declined to place working capital at the disposal of the Board to push the business forward. It was perhaps fair to the shareholders themselves that they should plainly understand that, although the increase in business was of a distinctly encouraging nature, the reduction made in the prices of the burners and mantles was so sweeping that the business must be increased still further before they could hope to derive the same income that was yielded at the old prices. The reason why shareholders should vote for the resolution now before them was plain, and might be said to be one of necessity, if they were desirous of getting the fullest benefits of the increased popularity secured by the bold policy of reduced prices. The Directors might have temporized, and not called the shareholders together to alter the Articles at the present time. They felt, however, it was only right the shareholders should be placed in possession of the facts without delay, and that the powers sought should be obtained immediately, so as to place the Company in a strong position to protect their business and effectually meet competition of every kind. In fixing the maximum amount of the powers sought at £250,000, regard was had to the possibility that some day or other in the future, the unsecured debentures given to the Sunlight Company in payment for their business might be paid off. If this were done, there would remain a maximum sum of £140,000 available for the development of the business. The Board intended, however, to raise such sums from time to time as might be actually necessary for the requirements of the Company. Should an issue of debentures be decided upon, it was the full intention of the Board to provide for their redemption. The Board did not regard this maximum sum as extravagant. They were of opinion, so far as they could estimate for the future, that at present it would be ample for the requirements of the business, and place it in a position of financial and trading security. It was, however, of course, clear that the discretion of the Board would be in no wise limited should it be found necessary to exercise, for the general purposes of the Company's increasing business, the whole of the powers that would be conferred by the amended Articles. He moved the adoption of the resolution.

Mr. JAMES HEAD seconded the motion.

A little information having been sought and given on one of the minor clauses of the resolution, it was put to the meeting, when 87 voted for it, and 41 against. The requisite majority in favour not having been obtained, a poll was demanded, and was immediately proceeded with—the Chairman stating that the result would be announced at the offices of the Company on Saturday.

This was done; the votes for the resolution (representing nearly two millions of stock) being 393,232, and against (representing £11,000) 2158. The figures show that there is a very decided opinion on the part of a very large proportion of the shareholders in favour of the proposal to grant the Directors facilities for borrowing. The sanction of the preference stockholders to the scheme has still to be obtained at the adjourned meeting to-morrow. The best way for the shareholders to look after their interests is to attend, when the Board, who have pursued a straightforward course in the matter by facing the shareholders with the position at the earliest possible moment, can be asked for explanations in support of their policy.

## GAS-WORKS EXTENSIONS AND THE COLLIERY QUESTION AT BRADFORD.

Last Thursday, a Special Meeting of the Bradford City Council was held to consider the provisions of the Bill which the Council are going to promote in the ensuing session of Parliament. The Gas Committee asked for powers to extend the Birkshall and Valley Road Gas-Works; to enable the Corporation to manufacture and store gas on lands belonging to them, and on which they are not now authorized to manufacture and store gas; and to borrow £150,000 for carrying out these extensions and other works in connection with the gas undertaking. The Committee's recommendation was approved. Another item on the *agenda* paper was the resolution passed by the Council on the 9th inst., that powers be sought to acquire and work a colliery or collieries for supplying the coal required by the Corporation for use in their various undertakings. Mr. Johnson inquired if the Council could get the Bill through Parliament with such a clause in. The Mayor (Mr. W. C. Lupton) said he was informed that the addition of the clause to the Bill would imperil the promoters' chances of success with regard to other clauses. In the present state of feeling, it was not at all likely that the clause would be passed; and it was felt, on the other hand, that its retention might have a tendency to prejudice the Bill in other respects. He did not express any opinion on the resolution; he was simply giving information which he had received. Mr. Williamson moved that the clause be omitted from the Bill; and the amendment was seconded by Mr. T. L. Atkinson. Mr. E. R. Hartley submitted that notice of motion would have to be given before the resolution could be rescinded. The Mayor agreed; and it was understood that the required notice would be given before the next Council meeting.

Commenting on the proposals in the Bill, a Bradford contemporary says: "On the whole, the Council are pledged to a very formidable Bill; but a good many will think it a pity if the Council do not press a clause as to a municipal colliery. *Primâ facie*, it is a 'big order;' but some corporation has to be first in these matters. From the owning of the means of gas production to the owning of the coal is not a long step; and some intelligent persistence on the part of Counsel might work wonders."

## LAUNCESTON CORPORATION AND THE GAS COMPANY.

### The Breaking Up of the Streets.

Considerable discussion took place at the meeting of the Launceston Town Council yesterday week with reference to the new contract with the Gas Company respecting the lighting of the public lamps. It had been decided at the previous meeting to accept the terms of the Company, to light the lamps for one year at an additional cost of 5s. per lamp; but the Council decided that in future the Company should be required to give the Surveyor notice of their intention to break up roads, and that the Surveyor should do the work of opening and restoring the roads at the expense of the Company. The Company now wrote that this condition could not be carried out without extreme inconvenience, and even danger in the case of the breaking of pipes or sudden escape of gas; and the Directors could not possibly accept the arbitrary terms proposed to be attached to the contract. They added that the terms proposed by the Company were most liberal, and they failed to see why so much animus should be shown by the Council. The Company had only continued to light the streets in order that the town might not be inconvenienced; and it was now necessary to have a prompt and definite acceptance or refusal of the Company's terms. The Mayor (Mr. J. Treleaven), who is the Manager of the Gas Company, vacated the chair during the discussion of the subject.

Mr. TROOD suggested that if the Company could not accept the terms of the Council, tenders should be obtained for lighting the streets with oil for the present winter.

Mr. STEPHENS was opposed to their going back to oil lighting, but thought they might adopt the electric light. He was strongly of opinion that the Council should not alter their terms; for they were not only within their right in requiring that the Surveyor should alone interfere with the streets, but it was to the advantage of the Company.

Mr. SYMONS denied that there was anything arbitrary in the terms of the Council, and said he was astonished that the Company had not accepted them.

Mr. SHUKER said the Manager of the Company accepted the terms, and the Company ought to have felt bound by his action.

The SURVEYOR, in answer to questions, said he thought there was force enough in the River Kensey, or in their water supply, to generate sufficient electricity to light the town. Or they might adopt incandescent oil lighting, which was in use in Ripon and was to be adopted by two or three other Yorkshire towns.

It was finally decided to adhere to the terms offered to the Gas Company. The Surveyor was instructed to make inquiries as to the cost of electric lighting, and also as to the system of lighting in use at Ripon. In the event of the town being left in darkness by the discontinuance of the lighting of the lamps, the Deputy-Mayor was instructed to call a meeting of the inhabitants to discuss the matter with them.

The Directors of the Imperial Continental Gas Association recommend a dividend of 5 per cent. for the half year ending the 30th of June, free of tax.

## ELECTRIC LIGHTING NOTES.

In their electric lighting undertaking, the Heywood Town Council are providing for 4000 lights of 8-candle power; and they have already received applications for 2700 lights.

In preference to extending the present electricity works at Powick, the Worcester City Council have determined to acquire an extensive site, at a cost of £4450, for a supplemental station—principally for generating current for the tramways.

The Skipton District Council, having decided to apply for powers to enable them to lay down plant and supply electricity, recently sent out circulars to the larger consumers of gas; and the replies show that 93 consumers are prepared to use the electric light, 95 have refused to adopt it, and 95 have not answered.

A scheme for the supply of electric light and energy, conjointly with a tramway service, for a large area embracing Castleford, Featherstone, Pontefract, and Knottingley, is being promoted by the United Kingdom Tramway, Light Railway, and Electrical Syndicate, of Westminster, whose head is Major Tulloch, C.B., late Chief Engineering Inspector to the Local Government Board.

Says the "Coventry Herald": The well-to-do residents of the city do not favour the electric light as numerously as might be expected. Some of the sub-stations in the wealthy parts of the city have few customers. On the other hand, there have been considerable developments among the poorer class of property, where it was least expected. The number of customers is now 301, against 159 about a year ago; but the light must be taken much more freely than it has been if it is not to continue a burden upon the rates.

The Town Clerk of Limerick has received a letter from the Local Government Board in reply to the application of the Corporation for a loan of £22,000 to carry out a scheme of electric lighting for the city. The letter states that, having carefully considered all the circumstances, especially the high rating in the borough, and the present unsatisfactory condition of the Corporation finances, the Board are of opinion that a sufficiently strong case has not been established to warrant them in giving their sanction to the loan at present; but the matter may be revived if the position of the Corporation as owners of the gas-works be again threatened.

Considerable inconvenience was caused at Hull last Saturday week by the failure of the electric light over a considerable area in the busiest part of the city. In some of the large shops not provided with a gas supply business was practically suspended until nearly ten o'clock; and considering that Saturday night is the busiest one in the week, the tradesmen must have suffered a serious loss. All they had for illumination was a candle or two upon the counter. Their windows were dark, and this darkened the streets. At several hotels, and at the Constitutional Club, candles had to be used as the only means of obtaining light. The cause of the failure was a short circuit, and not a breakdown of the dynamos as was generally supposed.

The Eccles Corporation originally obtained the permission of the Local Government Board to borrow £12,114 for their electric lighting undertaking; and they have overspent that sum by £5308. Application to the Board for sanction to borrow this further amount resulted in an inquiry by Colonel J. T. Marsh last Thursday. It was stated by the Town Clerk that practically the whole of the money over expended was for extensions; but he was promptly told by Colonel Marsh that the proper time to have applied to the Board for the money was when the extensions were taken in hand. It was also mentioned by the Town Clerk that the loss for the first year, including repayment of principal and interest, was £789. There was no opposition.

During the third year of the working of the Harrogate Corporation electric lighting undertaking 365,404 units of electricity have been sold, as against 201,363 in the second; bringing in a total revenue of £8400—an increase of £1732. The net profit for the year, after the payment of all charges, is £777. The previous year showed a deficit of £729, which has now been discharged. At the last meeting of the Council, the Town Clerk was instructed to apply to the Local Government Board for sanction to a further loan of £10,000 for a new boiler-house and generating plant equal to the supply of 10,000 additional lamps. Another trunk main from the works to the town has also been arranged for. This immediate extension, however, forms only a portion of what is contemplated. The remainder of the projected works will probably involve the outlay of about £40,000.

In a report presented at the meeting of the Newport County Council yesterday week, the Electricity Committee stated that £91,235 had been expended upon the electric light undertaking, of which £80,315 had been sanctioned, and that an additional sum of £30,000 would be required to cover the cost of further extensions and mains and transformers, and for the proposed changing over to the 250-volt system. In reply to Mr. Wilkinson, the Chairman of the Committee (Mr. G. H. Llewellyn) said he hoped the Council would be called upon to go on spending further sums, in order to secure to Newport the great advantages likely to arise from the electrical installation. Mr. Wilkinson thought it was not spending money, but "chucking" it away. At a subsequent stage, Alderman Parnall proposed that application be made to borrow the £30,000 needed, and this was agreed to; the Town Clerk explaining that £10,000 had been already expended.

The Bishop of Rochester had an unusual experience in St. James's Church, Bermondsey, on Monday evening last week. The church has been in the hands of the decorators for some time, and during the period it was closed the electric light was installed. At the re-opening service, the church, which accommodates 1500 worshippers, was crowded, and the Bishop had nearly reached the close of an impressive sermon when the electric light went out, leaving the congregation in darkness, save for a gas-jet or two at either end of the building. Dr. Talbot paused in his discourse to say that it would not hurt his hearers to be in the dark; and he then continued his sermon, the delivery of which was interrupted by the exit of a good many worshippers. It appears that the failure was not due to any defect in the installation at the church, as other buildings in the neighbourhood were similarly affected.

Free-wiring is the rage just now among the electricity committees of local authorities. For some time a week has not passed without our having seen that this or that electricity committee have been considering the question. In nearly all cases, we read that the initial cost of wiring is a great hindrance to people introducing the electric light; and this gives the impression that, in such cases, new business is not coming in so fast as the committees would like to see, and hope for better things is found in free-wiring. But why call it "free" wiring, when, as a rule, the householder whose premises are so fitted is charged an extra penny per unit for the electricity used? There would be just as much sense in prefixing the word "free" to the fittings supplied under the prepayment gas-meter system. But, of course, it is a catch phrase, and intended to delude. The Cardiff Corporation Electricity Committee are among the latest to adopt the system. They consider the present time, when the price of gas is "high," opportune for striking out into this new branch; and no doubt they expect big results therefrom.

At last Tuesday's meeting of the London County Council, the Highways Committee reported on the result of the question of the alteration from 100 volts to 200 volts of the standard pressure given by the City of London Electric Lighting Company with respect to their Southwark Electric Lighting Order, 1891. The Council gave their permission subject to twelve conditions; but the Company were unwilling to accept them, and appealed to the Board of Trade. After holding an inquiry, the Board issued their award, in which only the first of the conditions was allowed. This was, shortly, that any necessary alterations to the wiring or fittings on a consumer's premises, and the repair of any damage incidental to such alterations, should be carried out by the Company at their own cost; and provision was made for reference to arbitration in case of dispute between the Company and a consumer. Our readers may remember that in April last the Magistrate at the Southwark Police Court dismissed six summonses taken out by the Council against the London Electric Supply Corporation for not maintaining a constant supply of electric energy. (See "JOURNAL" for May 1, p. 1135.) The Magistrate stated a case; but the Company had said it was very improbable that there would be any failure in the future, and had asked that further proceedings might be abandoned. The Highways Committee recommended this course; and it was agreed to.

Last Thursday, the first stone of the electricity and refuse destruction works which are in course of erection by the Hackney Vestry at Clapton was laid by Mr. W. H. Dickinson, Chairman of the London County Council. The site consists of five acres of land; and there is ample room for extensions. The mains are now being laid in the principal thoroughfares of Hackney. For public street lighting, 320 arc lamps will be erected on pillars 21 feet above the ground and from 50 to 60 yards apart. The refuse destructor will consist of 12 furnace cells capable of burning a maximum of 150 tons of refuse per 24 hours. Mr. G. A. Ogan, the Chairman of the Electric Lighting Committee, and Mr. Robert Hammond, the Consulting Engineer to the Vestry, having briefly addressed the gathering, Mr. Dickinson said he understood the question of electric lighting had been a subject of controversy in Hackney since 1893, and at one time there was a danger of the Provisional Order being handed over to a trading company. He was glad the privilege the Vestry had obtained had been kept for the benefit of the ratepayers. The cost of the present undertaking would be £250,000; and it was contemplated to supply the light at 4d. per unit for private houses, 3d. per unit for public lighting, and 2d. per unit for power. After four years' working, it was estimated that the electric lighting and the dust destructor would, combined, bring to the parish a profit of £18,000 a year. This meant 4d. in the pound off the rates in the district. He had gone carefully into the figures, and saw no reason to doubt their accuracy. If the ratepayers looked upon the concern as a co-operative enterprise, in which they were the shareholders and consumers and the new Council its board of directors, there was nothing to prevent its absolute success.

Our readers may remember that the Marylebone Electric Supply Company introduced a Bill last session to obtain power to supply electricity within the area of the Marylebone Vestry, in competition with the Metropolitan Electric Supply Company, who had previously been furnishing current in the district. The Bill was thrown out owing to the opposition of the Vestry, who had for some time been negotiating with the Metropolitan Company for the purchase of the portion of their undertaking within the Vestry's area. The negotiations terminated in August; and a provisional agreement was entered into by which the Company agreed to sell the part of the undertaking in question, including the two generating stations at Manchester Square and Rathbone Place, together with all the mains, &c., and the equivalent of some 300,000 8-candle power lamps connected thereto. The purchase-money was to be paid in 5½ per cent. bonds; the actual amount, at the market value of the bonds, being about £913,000. The agreement further stipulated that nothing was to prevent the Vestry from erecting and working other generating stations; but that in the event of their desiring, before such stations could be erected, to purchase current, it must be obtained from the Metropolitan Company only. According to the bye-laws of the Vestry, no agreement can become operative until after the minutes of the meeting at which it was passed have been read and confirmed. Since August, considerable opposition to the scheme has been manifested to the course the Vestry had taken; and at a special meeting of that body held last Tuesday, the subject was again considered on a motion by Mr. E. White that the minutes in regard thereto should not be confirmed. After a discussion lasting more than three hours, the motion was carried by 31 votes to 26; a subsequent division producing the same result. The provisional agreement consequently falls to the ground. The Vestry have now given notice of their intention to apply for a Provisional Order to establish a supply of their own.

It is human nature to feel a little gratification, when in a passing difficulty, to know that someone else is in the same boat; and it is easy to picture a smile of satisfaction on the faces of most readers to find another illustration this week of the effect that the price of coal is having on our electric competitor. The Lighting and Electricity Committee of the Croydon County Council have been considering the price charged for arc lighting. At the present time there are 135 arc lamps of various kinds and sizes in the borough, the average charge for which is £18 per lamp. When the charge for these lamps was fixed, it was based on the then price of coal, and practically at cost price. At the present price of coal, the Committee reported at the last meeting of the Council, the arc lighting is being produced at a loss. The Committee therefore recommended the Council to sanction an average price of £21 per arc lamp being charged to the expiration of the coal contract on June 30 next. Another recommendation will give satisfaction; and it was that an addi-

tional fifty street-lamps in the district should be fitted with incandescent gas-lights. Alderman Miller, who moved the adoption of the report, seemed to regard with contempt such an increase as £3 per lamp, and referred to it as a very small matter. Perhaps Alderman Miller is an exceptionally wealthy man, to whom a few hundreds extra expenditure per year is a "small matter." If so, he is not the most economical administrator for the ratepayers of Croydon. But to proceed. Following Alderman Miller, Alderman Taylor hoped the Committee would see their way to give a better light than they had done for weeks past. Then Alderman Foss pointed out that the "small matter" was an increase of 13 per cent. [Should it not be about 16½ per cent.?] And he did not think any of the members would like to be called upon to pay an increase of 13 per cent. on their rating, or 13 per cent. interest. In his reply, Alderman Miller made the admission that, even with the increase, the charge would only be cost price, and up to last year it was less than cost price.

A report has just been issued by the Lighting Committee of the Leeds City Council, giving a review of the work done during the year ended the 25th of March last. It is pointed out that, the period under review being the first complete year of the Corporation's ownership of the electric light undertaking, materials are not available for a tabulated comparison of results with those of previous years; but it is shown that the business has undergone considerable expansion since its acquisition by the Corporation. The number of consumers and the lamps, &c., installed, expressed in the equivalent of 35-watt (8-candle power) lamps, were respectively as follows: On March 25, 1899, the number of consumers was 980; on March 25, 1900, it was 1393—increase, 413 (42·1 per cent.). Lamps installed on March 25, 1899, 78,380; on March 25, 1900, 106,263—increase, 27,883 (35·5 per cent.). The units sold were 2,005,840; the revenue from this source, after provision for discounts and bad debts, being £34,156—an average price of 4·09d. per unit. The average consumption of current per 35-watt lamp was 21 units; yielding a revenue of 7s. 1·8d. per lamp. The capacity of the works had been increased during the year by the addition of a combined engine and alternator of 640 kilowatts (1000 indicated horse power) with the necessary boilers, pipes, &c., bringing the total capacity up to 3040 kilowatts (5300 indicated horse power); and two similar sets remained on order at the close of the year. A report had been obtained from Messrs. Hopkinson and Talbot, the Consulting Engineers; and, in accordance with their advice, it had been decided that in future extensions of plant the two-phase alternating system should be adopted. The capital expenditure during the year was £75,006; and the total capital outlay to March 25 was £307,520, including £217,420 paid to the Yorkshire House-to-House Electricity Company, Limited, as purchase-money for the undertaking as on Aug. 31, 1898. The total receipts on revenue account were £36,220; and the working expenses, £9929 (1·19d. per unit sold)—leaving a gross profit of £26,291. After deducting interest (£12,473) and sinking-fund charges (£5316), a net profit remained of £8502. The total surplus on the 25th of March was: On capital suspense account, £3785; on revenue account, £8502—a total of £12,287. Of this amount, £4000 had since been applied in relief of the rates. The working expenses per unit sold are the lowest recorded in the history of the undertaking for a complete year.

It was scarcely to be expected that the figures quoted in the "JOURNAL" last week from the "Surrey Comet," in regard to the financial results of the electric light undertaking of the Kingston Corporation, would be allowed to pass unnoticed by some supporter of the scheme; and consequently Mr. G. Eaton Hart has come forward to disprove the assertions of Mr. Bolton, the previous correspondent. Mr. Hart explains that it has been the custom for the borough accounts to run up to the end of March; and until this year the Electrical Engineer's accounts have been made up to the previous December. The result has been that while the former accounts take in all the expenditure, they only show the actual cash received—not reckoning the large sums owing by consumers for current during the three months from December to March, amounting to between £1000 and £2000. As to depreciation, Mr. Hart asks Mr. Bolton if he has not overlooked the fact that the Corporation, like other municipal bodies, return the whole of the capital, with interest, within 25 years. Is it reasonable, he asks, to expect that they should establish a business necessitating a large capital outlay, pay interest on the borrowed money, pay profits, allow depreciation which would practically purchase the whole plant in 16 years, and then repay the capital outlay? Moreover, is not the goodwill of any value? Mr. Hart gives the following figures as furnishing a correct statement of the accounts of the electricity supply works up to March last:—

*Revenue Account.*

| Dec. | Receipts. | | Expenditure. | | Deficit. |
|---|---|---|---|---|---|
| 1895 . . . . | £2441 19 3 | .. | £3824 9 1 | .. | £1,382 9 10 |
| 1896 . . . . | 3012 19 1 | .. | 4339 4 8 | .. | 1,326 5 7 |
| 1897 . . . . | 3929 0 6 | .. | 4720 19 4 | .. | 791 18 10 |
| 1898 . . . . | 4700 18 10 | .. | 5812 19 7 | .. | 1,112 0 9 |
| Jan. 1, 1899, to March, 1900 . . | 7511 18 9 | .. | 7559 17 8 | .. | 47 18 11 |
| Total deficit . . . . . | | | | | £4,650 13 11 |

*Capital Account.*

| | |
|---|---|
| The total spent on buildings up to March, 1900, was . . . | £7,975 16 4 |
| On electrical and other plant . . . . . | 40,484 8 11 |
| Total outlay . . . . . | £48,460 5 3 |
| Less repaid . . . . . | 4,713 4 11 |
| Balance . . . . . | £43,757 0 4 |

Mr. Hart says these figures show that, after providing for interest and the repayment of the loans (included in the expenditure), the actual loss on the undertaking for the 15 months ending in March was only about £47. He advises the burgesses to possess their souls in patience, as there is going to be "a great boom" in electricity supply at Kingston within a very short time. It is to be hoped that they may not be eventually disappointed.

Colonel Sadler, M.P., is to be entertained at a banquet early in December, in celebration of his victory at Middlesbrough, and of his being the first Conservative or Unionist representative returned since the enfranchisement of the town.

## GROWTH OF LIVERPOOL'S WATER CONSUMPTION.

Responding to a vote of thanks for his services during the past year, Alderman W. J. Burgess last Tuesday gave his colleagues on the Liverpool Corporation Water Committee an interesting account of the manner in which the demand for water is advancing in the city. He said the past twelve months had been marked by steady progress in the consumption. The new tenants within the compulsory limits had been 3544; and it was estimated that they had supplied an additional population of about 11,000. The total number of water tenants in Liverpool and the suburbs was now 171,392; and the population supplied was estimated at 833,000. The department had distributed during the year 10,084,579,000 gallons, which was an increase of 520,065,000 gallons over the quantity supplied in the previous year, and represented a daily average of above 27½ million gallons. He was glad to say that the supply for trade and manufacturing purposes and for shipping showed a large increase—a circumstance which was, of course, indicative of the progress and prosperity of the city and port. There had been an increase of 63,260,000 gallons for trade purposes, and of 21,236,400 gallons in the quantity supplied to shipping. The amount of water sold in bulk by meter along the lines of the Rivington and Vyrnwy aqueducts was 475,045,000 gallons, or 28,075,000 gallons more than in the previous year. They had laid down in and around the city about ten miles of new mains during the twelve months. The chemical and bacteriological analyses, which had as usual been regularly made, had given highly satisfactory results, showing that the high standard of purity attained by the Liverpool water was fully upheld. They were deeply impressed with the importance of protecting the purity of the sources of supply, and had recently purchased land on their watershed at Rivington principally for that purpose. To make the supply thoroughly effective, various new works had been entered upon. Considerable progress had been already made with the tunnel connecting the Cowny watershed with Lake Vyrnwy, and new filter-beds were in the course of construction at Oswestry and Chorley. A very important extension decided upon during the year was the construction of a new reservoir at Prescot, capable of storing 100 million gallons of water. A tender for this work would be recommended for acceptance, and, he hoped, sanctioned, at the next meeting of the Council. He reminded them that such a reservoir was contemplated originally as part of the Vyrnwy scheme; and in view of the increased and increasing demand for water, its construction had now become an imperative necessity. During the year the negotiations with the District Council of Wallasey had been brought to a successful issue—an agreement to supply water from the Vyrnwy aqueduct having been signed; and the laying of pipes to Wallasey would be commenced as soon as the consent of the Local Government Board was obtained. He was sure he was only expressing the feeling of every member of the Committee in acknowledging the efficient manner in which the work of the department has been performed by the Engineer and by every member of his staff; and in this connection it was only right that special mention should be made of the most interesting historical and engineering description of the works contained in the recently published report of the Engineer. The rapid increase in the consumption of water indicated clearly that the construction of a second line of pipes from Vyrnwy could not safely be postponed very much longer; and while the Committee would, of course, be wishful not to enter upon the large expenditure which that work would involve before it was really necessary, he was sure that, when fully convinced of the necessity for undertaking the work, there would be no hesitation in fulfilling to the utmost the obligation which rested upon them to secure for those who relied upon the Liverpool water undertaking that ample and sufficient supply which was so desirable and necessary for the health of the population.

## FALMOUTH CORPORATION AND THE WATER-WORKS.

### Rejection of the Purchase Scheme.

In accordance with the decision of the Town Council (*ante*, p. 970), a meeting of the ratepayers of Falmouth was held yesterday week, to consider the expediency of promoting a Bill in Parliament for the purchase of the undertaking of the Falmouth Water Company. So large was the attendance, that it was necessary to adjourn the meeting from the Town Hall to the Drill Hall.

The MAYOR (Mr. F. J. Bowles), who presided, proposed a resolution in favour of promoting the Bill. He expressed the opinion that the dissatisfaction which existed with regard to the water supply hindered the growth of the town as a health resort. Since the subject last came before the ratepayers a year ago, the Corporation had obtained the information which was then lacking; and it was now before them. They had approached the Company with a view to purchase by agreement, but had not met with much encouragement. They had pressed the Company to carry out improvements; and although some had been attempted, the best advice the Corporation could obtain showed that what had been done was insufficient in quantity and inefficient in quality. The filter-beds were condemned by every engineer who had seen them. The complaints with reference to the gathering-ground, the high-level service, and the treatment of the water after filtration had not been remedied; the supply generally continued intermittent; and the water was very dirty. He did not put the blame altogether on the Company, whose income was insufficient to carry out the improvements. An expenditure was necessary from which there could be no immediate return, besides which the Company did not possess the power to safeguard the sources of supply. They were advised that Parliament would probably grant them power to acquire the works; and there was some hope that the Company would, if they proceeded, be not unwilling to part with an undertaking which had no prospect of ultimate success. Mr. Phillips advised them that there would be little difficulty in obtaining powers to collect the same gross revenue as the Company now received; so that there would not be the loss they had been led to anticipate through the water-rate being charged on the net instead of the gross rateable value. The cost of acquiring the works, and carrying out the improvements and extensions which were absolutely and immediately necessary, was estimated at £74,500. In several recent cases, 60 years was allowed by Parliament

for the repayment of money raised for water-works purposes; but if they took the period at 50 years, and the interest at 3 per cent., the annual sum required would be £2880. The net revenue from the water-works last year was £2376, so that £500 would have to be raised from the rates; and on the present assessment, a rate of 3½d. in the pound would cover it. If 60 years were allowed, the annual cost would be less; but in any case a rate of 4d. to 5d. should cover every contingency. Was it worth while paying this sum for the increased benefit of the town? They must bear in mind that, once purchased, the property would become of increasing value, and ultimately would be a splendid asset to the town.

Alderman BANKS seconded the resolution; and said that, while there was no justification for the suspicions aroused as to the water supply, the reputation of the town must be above suspicion. There was quite enough sense in the town to manage the water works; while a loss to the town as a health and holiday resort would be a great deal more than the amount which would have to be paid out of the rates towards the purchase of the undertaking.

Mr. R. N. ROGERS contended that the sewage scheme was of more importance than the water supply. If the latter was not satisfactory, the Corporation should insist upon the Company improving it.

Mr. H. L. OWEN twitted members of the Corporation who talked of having an "open mind" with sitting on the fence.

Mr. J. W. BUCKLEY was of opinion that it would be to their advantage to have the water supply under the control of the Town Council.

Mr. W. P. DUNNING said samples of the water had been analyzed and not condemned. The only fault was that it contained a little peaty matter, and was discoloured.

Mr. R FOX said that, although the condition of the water-works was far from ideal, a lot had been done towards improvement. The Council must do their utmost to induce the Company to effect further improvements. A great deal depended on the renewal of the pipes; and pressure must be put on the sanitary authorities to make sure that the gathering-ground was not subject to pollution.

On a vote being taken, a large majority was found to be against the scheme. A poll was demanded.

## THE WATER SUPPLY OF NEW YORK.

The needs of New York, as regards water, and the best methods of meeting them, have been the subject of a thorough investigation by the Merchants' Association of the city. The "Engineering Record" states, as evidence of the importance of the inquiry, that it was conducted by a General Committee of 33 men well representing the engineering, legal, and commercial interests. This Committee was sub-divided into an Executive Committee of nine (including Messrs. Thomas C. Clarke, D. Le Roy Dresser, Rudolph Hering, and Edward P. North) and four Special Sub-Committees. The Engineering Committee included the above-named gentlemen. There was also a Committee on Municipal Finance and Public Policy, who worked with the Comptroller (the Hon. B. S. Coler) and his staff in obtaining a record of the financial history of the city water-works; a Legislation Committee, who furnished a report of particular interest with regard to inter-state rights to water; and a Fire Protection and Insurance Committee. We learn from our American contemporary that in many respects the most important fact decided by the report of the General Committee is the inexpediency of attempting to develop for New York the supplies of the Housatonic and Ten Mile Rivers Basins, which would unquestionably yield an abundant amount of water of excellent quality if the boundaries staked out by man conformed with those of Nature. Unfortunately, however, this is not the case; and the legal uncertainties will force New York to pay several times as much for its water in consequence, even if the least expensive of the projects is adopted. There is absolutely no question as to the necessity of taking steps at once to obtain a new supply. Mr. Freeman discussed the subject very thoroughly in his report already noticed; and the Engineering Committee, in the latest investigation, reach practically the same result—that is to say, the supply in Manhattan and the Bronx will be exhausted by the consumption in 1903 if some means of checking waste are not introduced, while if an attempt is made to prevent waste the present supply may be rendered sufficient for the demands up to 1910. The latter date is a little farther off than Mr. Freeman's limit.

There being thus no question of the need of immediately building new works, our contemporary says it is interesting to notice the substantial agreement between the Engineering Committee and Mr. Freeman with regard to the source to be used for this additional supply. Mr. Freeman was an advocate, first, of the Housatonic and Ten Mile Rivers supply; but, this being thrown out on legal grounds, his apparent second choice would be the Hudson River—the source recommended by the Committee. The plan advocated by the latter is the construction of pumping-stations and filter-beds on the east side of the river, and an aqueduct to the northern limits of the city, where a new reservoir is to be built; or the construction of a great aqueduct to the city from the North Hudson near Hadley. It is proposed, in the case of the first project, to make the original installation of 100 million gallons daily capacity, but capable of extensions to any necessary amount. In order to prevent the river above Poughkeepsie from becoming brackish from the tide, because of the withdrawal of large amounts of fresh water, it is proposed to build compensating reservoirs in the Adirondacks, in which flood waters may be stored for delivery into the river during the dry season. Such reservoirs have frequently been recommended for the improvement of navigation, the prevention of floods, and the regulation of flow for power purposes. A supply of 250 million gallons daily of filtered water can be delivered in this manner at the city line, at the level of Jerome Park reservoir, at a cost of $28·33 per million gallons. The cost of an equal supply from the Adirondacks will be $30.

Having thus established the need for new works, and the possibility of obtaining a supply at a very low cost, it is interesting to notice that up to the present time the New York Water-Works Department has yielded a handsome revenue, and it can well afford to incur heavy expenses for new plant. From 1832, when the city began to develop the Croton watershed, down to 1884, the total expense for construction was $37,382,521; while the profit on working was $3,060,938. From 1884, when a new supply was found necessary, to the close of 1889, when the new aqueduct was finished, a sum of $24,571,264 was spent on construction. The profit—that is, the difference between the revenue and the total expense for maintenance, interest, &c., during this time was $4,510,543. The third period, beginning in 1890, when the water was first delivered through the new aqueduct, and ending in 1898, the latest date at which statistics are available, showed a total expense for construction of $24,405,776, and a profit of $13,901,602. In other words, during this term of 67 years, the city of New York made a capital investment of $86,359,562 for the construction of its water-works. It expended during that period for interest charges, maintenance, and operation, $66,544,245; the aggregate earnings were $88,017,329; and the total net profits were $21,473,084. The maximum cost of water per million gallons, obtained by dividing the total annual charge by the quantity delivered, was $54·20 in 1849; while from 1866 to 1898 inclusive it was $35·06. The annual cost of distributing the water is not less than $10 per million gallons at present; while the approximate cost at the city line is $29·07. The average revenue since 1865 from the Croton system has been $52·87 per million.

It is now possible to understand the utter foolishness of the proposed contract with the Ramapo Water Company. By the terms of that agreement, the Company were to build and maintain at their own expense works equal to deliver 200 million gallons of water daily at the city line under a head of 300 feet. The Municipality were to pay $70 per million gallons for the water; the first delivery to begin in 1902, and the supply to continue for 40 years. At the end of that time, the works were to remain the property of the Company.

It is unnecessary to follow all the calculations in the report in analyzing the proposed contract. Figures vouched for by such a Committee as that which produced it may be accepted as correct. The method of the computation is the only correct one, in that it assumes that the works are first built for a capacity of 100 million gallons and are enlarged in 1911, 1914, and 1917 by 50 million gallons at each addition. An allowance of 3 per cent. has been made for interest, 4 per cent. for sinking fund, and suitable amounts for depreciation and operation. The payments to the Ramapo Company are assumed to be for the same quantity of water as is delivered under the municipal works. The conclusions drawn are as follows:—

1.—By 1937 the city would own its plant under the municipal system free from all debt, and would own nothing under the Ramapo system.

2.—Between 1906 and 1917 the city, under municipal ownership, would have an annual deficit beginning with about $1,800,000 in 1906 and ending with about $104,000 in 1917; but that thereafter, beginning in 1918, it would commence to make a profit which in that year would be about $133,000, and would constantly increase year by year until 1945 (a date chosen because it is the termination of the proposed Ramapo contract), in which year it would be about $3,100,000. The excess of this profit over the deficit in the 40 years of operation from 1906 to 1945 would be about $48,000,000—a sum which represents the cash profit to the city during that period under municipal ownership.

3.—Under the proposed contract, the payment to the Ramapo Company of $70 per million gallons, less the revenue from consumers at $50·29 per million gallons, would result in a deficit to the city of more than $60,000,000.

4.—If, therefore, the city should fail to build and operate its own water supply, and should make a contract with the Ramapo Company, it would suffer a loss of $108,000,000 in the forty years of operation.

5.—But this sum of $108,000,000 does not represent the total loss to the city, for it would own no plant under the Ramapo system, while under the municipal ownership plan it would have paid for its plant by 1937, and own it free of indebtedness thereafter. The total cash and property loss, therefore, would be $145,000,000 on a system supplying only 250 million gallons daily.

6.—Furthermore, by 1920 another system, to meet the increasing needs of the city, and to supply an additional 250 million gallons daily, must be constructed. During the 25 years of the operation of this new system a further loss of at least $50,000,000 to the city would result, compared with a contract with the Ramapo Company for such additional supply at the proposed price. This makes the total loss to the city during 40 years over $195,000,000.

7.—The operation of increasing the supply from the Hudson every 15 or 20 years by an additional supply of 250 million gallons daily is a perfectly feasible plan, not only from an engineering, but most of all from a financial, standpoint. The supplying of water to its citizens becomes an increasingly profitable enterprise; while, on the other hand, contracting with the Ramapo Company would probably result in giving that Company the monopoly of future additional supplies for the city.

The situation in which the city finds itself, in the matter of contracting with the Ramapo Water Company, is particularly interesting, owing to the manner in which the Legislature has granted extraordinary privileges to the Company, and curtailed those of the city in as remarkable a manner. The Company have full power to supply water to any municipality and public or private corporation, without the usual requirement for filing an amended certificate or obtaining the consent of local authorities. Such powers require special legislation, and are possessed in New York State by this Company only. There have also been given broad powers of condemnation, which make it practically impossible for anyone objecting to a line selected for an aqueduct to comply, within the time allowed, with the legal provisions for opposing the proceeding. As an additional safeguard to the Company, the expense of such opposition is very high.

In comparison with this showing of legislative favours to the Company, it is only necessary to refer to an Act cutting Brooklyn off from its natural source of supply for years to come, and another requiring it to pay enormous damages where fresh water has been appropriated which originally found its way into tide water. Even the Charter of the city had inserted in it a clause prohibiting the city from taking water from a supply devoted wholly or partly to the use of any other municipality. This was an entirely new idea in prohibitive legislation. This subject of legal restriction is the most important of all in its general influence on the citizens of the city. Fortunately for them, the legal advisers of the Merchants' Association state that legislation removing all these difficulties, and also the bugbear introduced by the constitutional limitation concerning the indebtedness of cities in the matter of water supply, ought

to be readily procured. The conclusions, therefore, reached by the Committee are as follows:—

1.—No contract whatever should be entered into with the Ramapo Water Company.

2.—The policy of supplying New York City with water by contract should be opposed by all lawful means.

3.—The Legislature should clothe the city with power to acquire by condemnation any water rights needed for its public water supply, excepting water rights actually used by, or necessary for, the supply of any other city, town, or village.

4.—The constitutional requirement that the bonds issued by the city for a water supply shall be included in ascertaining whether the city can become indebted for other municipal purposes, should be removed.

5.—The Comptroller's quarterly and annual reports should contain a clear and businesslike statement of the financial status of the city's investment in its water-works.

6.—A carefully devised system of detailed, accurate, and easily understood public records and reports should be adopted by the Department of Water Supply.

7.—The financing by the city of any addition to its water supply should include the application of the surplus of the revenues over expenditures to the redemption of bonds issued to establish the plant.

8.—Immediate steps should be taken by the city to acquire an additional supply of 250 million gallons of water daily from the Adirondack Mountain watershed by either of the systems proposed in this report.

9.—Immediate steps should be taken by the city officials to prevent the waste of water.

In closing its review of the Committee's report, our contemporary says the publication of such a book "does more to advance the standing of the engineering profession with the general public than a truckload of technical monographs;" and New York engineers should, it thinks, not be behind their fellow-citizens in helping to meet the expenses of this important investigation.

## NOTES FROM SCOTLAND.

**From Our Own Correspondent.**

*Saturday.*

In the municipal electioneering work which is proceeding, so far as I can learn, there are only two places in Scotland where the affairs of the local gas undertaking are being made to figure prominently. These places are Dundee and Greenock. It is almost needless to say that the affairs of a gas undertaking are never regarded as worthy of being obtruded upon the notice of the public unless there is a grievance, real or imaginary, to ventilate. It would be a matter worth a special record were any candidate to float into office upon the narrative of good work done in gas supply. On the other hand, many seek an entrance into public life by making believe that there has been gross mismanagement in the gas undertaking, which, of course, they, and they alone, would be able, or willing, to put right. It is the case, then, that in both these places there is a party who profess to have discovered that there are matters in connection with the gas-works which have not always proceeded upon a straight or above-board line.

In Dundee, for instance, where the question has been taken up by the "Dundee Courier," the charge is formulated, in a special article published on Wednesday of this week, that the accounts of the Gas Commissioners have not been properly kept. Were I satisfied that there was much force in the writer's contention, I would have forwarded a portion of the article; but having looked it through, I find the accusation is primarily that the capital account is not sufficiently detailed; and this again is watered down to an attempt to make out that, as distinguished from the policy followed in Glasgow, the Gas Commissioners in Dundee have expended too much in the redemption of annuities. Since 1868, a sum of £58,556 has been so expended; the annual saving being now £1967. Well, every town will conduct its business in its own way; and if in Glasgow they have not redeemed gas annuities, in the sense of buying them up and extinguishing them, the Gas Commissioners must have satisfied themselves that that was their best policy. It must be borne in mind that, on account of the very rapid increase in the output of gas, they have, in fact, reduced the value of the annuities per 1000 cubic feet of gas sold, till they are a comparative trifle. Had the gas consumption in Dundee expanded in the same ratio as it has in Glasgow, it is more than probable that the present criticisms would not have been heard. Roughly speaking, the gas consumption in Glasgow has increased by six times the amount it was before the transfer took place, in 1869; and in Dundee the increase has been four times what it was in 1868.

Having said so much upon the position of the outside complainer, it may not be out of place to give the views of ex-Provost Brownlee, who was at one time Convener of the Works Committee, as he laid them before the electors on Thursday. He said it was complained that their accounts could not be understood. He was bound to say they were not stated as clearly as they might be; but they were honestly stated, and any person conversant with gas affairs could work them out. But this was a matter that did not affect their pockets. It was the high price of gas. They would remember that at the annual meeting he opposed the increase; and he did so because he thought the rise in the price of coal abnormal, and only temporary. He had seen it as high before, and then it fell very low. He contended they should not put aside so large a sum for reconstruction, and that everything in excess of the statutory requirements should have been included in this year's estimates. Had this been done, no rise would have been necessary; and he was sure that his friends, who were so proud of beating him, would now be glad if they had taken his advice. However, this was not a very serious matter. The question still was: How was the gas 3s. 10d.? The matter had been aggravated in the public mind by the fact that in Broughty Ferry the price of gas had been reduced. At Broughty Ferry they were experimenting; and he thought they were not warranted in making a reduction till they had more experience of their experiment. They were enriching their gas with benzol, instead of cannel coal. Benzol was a species of naphtha; and it would readily be seen that if a few communities were going in for benzol, the supply being limited the price would go up so much that it would be

## GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

**Referred to on p. 1006.**

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment | Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| £ | | | p. c. | **GAS COMPANIES.** | | | £ s. d. | £ | | | p. c. | **GAS COMPANIES.** | | | £ s. d. |
| 590,000 | 10 | Oct. 12 | 10½ | Alliance & Dublin 10 p. c. | 19—20 | +½ | 5 5 0 | 60,000 | 5 | Sept. 28 | 7 | Ottoman, Ltd. | 5—5½ | .. | 6 7 3 |
| 100,000 | 10 | " | 7½ | Do. 7 p. c. | 18—14* | .. | 5 7 2 | 500,000 | 100 | June 1 | 6 | People's Gas of Chicago 2nd Mtg. Bonds | 102—106 | .. | 5 13 2 |
| 800,000 | 100 | July 2 | 5 | Australian 5 p. c. Deb. | 101—103 | .. | 4 17 1 | | | | | | | | |
| 200,000 | 5 | May 16 | 6 | Bombay, Ltd. | 6—6½ | .. | 4 13 4 | 851,070 | 10 | Oct. 12 | 7 | River Plate Ord. | 10½—10¾* | .. | 6 10 2 |
| 40,000 | 5 | " | 6 | Do. New, £4 paid | 4—4½ | .. | 5 6 8 | 250,000 | Stk. | June 28 | 4 | Do. 4 p. c. Deb. | 99—101 | .. | 3 19 8 |
| 880,000 | Stk. | Aug. 15 | 12 | Brentford Consolidated | 245—255 | .. | 4 14 1 | 250,000 | 10 | Sept. 28 | 8 | San Paulo, Ltd. | 11—12 | .. | 6 13 4 |
| 270,000 | " | " | 9 | Do. New | 177—182 | .. | 4 18 11 | 185,000 | Stk. | Sept. 14 | 10 | Sheffield A. | 234—239 | .. | 4 3 8 |
| 50,000 | " | " | 5 | Do. 5 p. c. Pref. | 137—142 | .. | 3 10 5 | 209,700 | " | " | 10 | Do. B. | 234—239 | .. | 4 3 8 |
| 159,375 | " | June 14 | 4 | Do. 4 p. c. Deb. | 116—120 | .. | 3 6 8 | 447,427 | " | " | 10 | Do. C. | 232—237 | .. | 4 4 5 |
| 220,000 | Stk. | Sept. 14 | 10 | Brighton & Hove Orig. | 220—230 | .. | 4 6 11 | 5,641,885 | Stk. | Aug. 15 | 5½ | South Metrop. 4 p.c. Ord. | 128—134 | .. | 4 0 10 |
| 226,320 | " | " | 7 | Do. A. Ord. Stk. | 150—160 | .. | 4 7 6 | 1,520,000 | " | July 12 | 3 | Do. 3 p. c. Deb. | 94—97 | .. | 3 1 10 |
| 1,009,500 | Stk. | Aug. 29 | 5 | Bristol, 5 p. c. max. | 117—118 | .. | 4 4 9 | 380,940 | Stk. | May 16 | 5 | Southampton Ord. | 110—115 | .. | 4 6 11 |
| 420,000 | 20 | Sept. 28 | 10 | British | 39—41 | .. | 4 17 7 | 70,825 | " | July 12 | 4 | Do. 4 p.c. Deb. | 117—122 | .. | 3 5 7 |
| 50,000 | 10 | Aug. 15 | 12 | Bromley, Ord. 10 p. c. | 24—26 | .. | 4 12 4 | 120,000 | Stk. | Aug. 30 | 6 | Tottenham and Edmonton A. 5 p.c. B. 3½ p.c. 4 p. c. Deb. | 112—117 / 80—85 / 111—115 | .. | 5 2 7 / 5 5 11 / 3 9 7 |
| 79,000 | 10 | " | 9 | Do. 7 p. c. | 19—21 | .. | 4 5 8 | 250,520 | " | " | 4½ | | | | |
| 500,000 | 10 | Oct. 12 | 6 | Buenos Ayres (New) Ltd. | 8½—8¾* | .. | 6 17 2 | 61,550 | " | June 14 | 4 | | | | |
| 220,000 | Stk. | June 14 | 4 | Do. 4 p. c. Deb. | 98—100 | .. | 4 0 0 | 182,380 | 10 | Jan. 12 | 5 | Tuscan, Ltd. | 7—8 | .. | 6 5 0 |
| 150,000 | 20 | July 12 | 8½ | Cagliari, Ltd. | 23—25 | .. | 6 12 0 | 149,900 | 10 | July 2 | 5 | Do. 5 p. c. Deb. Red. | 98—102 | .. | 4 18 0 |
| 100,000 | 10 | Sept. 28 | 8 | Cape Town & Dis., Ltd. | 13½—14½ | .. | 5 10 4 | | | | | | | | |
| 50,000 | 50 | May 2 | 6 | Do. 6 p.c. 1st Mort. | 54—56 | .. | 5 7 2 | | | | | | | | |
| 550,000 | Stk. | Oct 12 | 12½ | Commercial Old Stock | 265—275* | .. | 4 12 8 | | | | | | | | |
| 236,425 | " | " | 9½ | Do. New do. | 200—210* | .. | 4 12 10 | | | | | | | | |
| 288,237 | " | June 14 | 4½ | Do. 4½ p. c. Deb. | 133—138 | .. | 3 5 8 | | | | | | | | |
| 800,000 | Stk. | May 31 | 9 | Continental Union, Ltd. | 175—180 | .. | 5 0 0 | | | | | | | | |
| 200,000 | " | " | 7 | Do. 7 p. c. Pref. | 170—175 | .. | 4 0 0 | | | | | | | | |
| 51,600 | Stk. | — | 14 | Croydon A 10 p. c. | — | .. | — | | | | | | | | |
| 178,400 | " | — | 11 | Do. B 7 p. c. | — | .. | — | | | | | | | | |
| 555,000 | Stk. | Aug. 15 | 5½ | Crystal Palace Ord. 5 p. c. | 115—120 | .. | 4 7 6 | 175,785 | " | Sept. 28 | 4½ | Do. 4½ p. c. Deb. | 143—148 | .. | 3 0 10 |
| 60,000 | " | " | 5 | Do. 5 p. c. Pref. | 133—135 | .. | 3 14 1 | 1,720,560 | Stk. | Oct. 12 | 7 | East London, Ord. | 194—199* | .. | 3 10 4 |
| 486,090 | 10 | July 27 | 11 | European, Ltd. | 19—20 | .. | 5 10 0 | 854,740 | " | June 14 | 4½ | Do. 4½ p. c. Deb. | 147—152 | .. | 2 19 3 |
| 354,060 | 10 | " | 11 | Do. £7 10s. paid | 14—15 | .. | 5 10 0 | 797,687 | " | " | 3 | Do. 3 p. c. Deb. | 97—99 | .. | 3 0 7 |
| 14,993,075 | Stk. | Aug. 15 | 4 1/16 | Gaslight and Coke 4 p. c. Ord. 3½ p. c. max. 4 p. c. Con. Pref. 3 p. c. Con. Deb. | 99—101 / 92—94 / 114—117 / 94—96 | .. / .. / .. / +1 | 4 7 2 / 3 14 6 / 3 8 5 / 3 2 6 | 700,000 | 50 | June 14 | 7½ | Grand Junction 10 p. c. max. 4 p. c. Deb. | 107—110 / 130—135 | .. / .. | 3 8 2 / 2 19 3 |
| 2,600,000 | " | " | 3½ | | | | | 810,000 | Stk. | Sept. 28 | 4 | | | | |
| 3,799,785 | " | " | 4 | | | | | 708,000 | Stk. | Aug. 30 | 14 | Kent | 300—305 | .. | 4 11 10 |
| 3,993,975 | " | June 14 | 3 | | | | | 160,000 | " | " | 7 | Do. New, 7 p. c. max. | 200—210 | .. | 3 6 8 |
| 70,000 | 10 | May 31 | 8 | Hongkong & China, Ltd. | 13½—14½ | .. | 5 10 4 | 1,043,800 | 100 | June 28 | 10½ | Lambeth, 10 p. c. max. | 292—297 | .. | 3 10 8 |
| 3,800,000 | Stk. | May 16 | 10 | Imperial Continental | 208—213 | .. | 4 13 11 | 406,200 | 100 | " | 8 | Do. 7½ p. c. max. | 205—210 | .. | 3 16 2 |
| 473,600 | Stk. | Aug. 15 | 3½ | Do. 3½ p. c. Deb. Red. | 99—101 | .. | 3 9 4 | 850,000 | Stk. | Sept. 28 | 4 | Do. 4 p. c. Deb. | 127—130 | .. | 3 1 7 |
| 75,000 | 5 | June 14 | 6 | Malta & Medn., Ltd. | 4½—5½ | .. | 5 14 3 | 500,000 | 100 | Aug. 15 | 14 | New River, New Shares | 410—415 | +2 | 3 7 8 |
| 560,000 | 100 | Oct. 1 | 5 | Met. of 5 p. c. Deb. | 105—108 | .. | 4 12 7 | 1,000,000 | Stk. | July 27 | 4 | Do. 4 p. c. Deb. | 128—133 | .. | 3 0 2 |
| 250,000 | 100 | " | 4½ | Melbourne 4½ p. c. Deb. | 104—106 | .. | 4 4 11 | 902,300 | Stk. | June 14 | 7½ | South-wark and Ord. 7½ p. c. max. 5 p. c. Pref. | 198—203 / 185—190 / 155—160 | +3 / .. / .. | 3 13 11 / 3 18 11 / 3 2 6 |
| 541,920 | 20 | May 31 | 3½ | Monte Video, Ltd. | 10½—11½ | .. | 6 1 8 | 126,500 | 100 | " | 7½ | | | | |
| 667,946 | Stk. | Aug. 30 | 9½ | Newc'tle & Gatesh'd Con. | 210—215 | .. | 4 6 1 | 489,200 | Stk. | " | 5 | | | | |
| 299,855 | Stk. | June 28 | 3½ | Do. 3½ p. c. Deb. | 104—107 | .. | 3 5 5 | 1,019,585 | " | Oct. 12 | 4 | Vauxhall 4 p. c. A Deb. | 128—133 | +1 | 3 0 2 |
| 150,000 | 5 | May 16 | 8 | Oriental, Ltd. | 7—7½ | −¼ | 5 6 8 | 1,155,066 | Stk. | June 14 | 10 | West Middlesex | 275—280 | .. | 3 11 5 |
| 135,000 | 5 | " | 8 | Do. New, £4 10s. pd. | 5⅞—6⅛ | .. | 5 15 3 | 200,000 | " | " | 4½ | Do. 4½ p. c. Deb. | 140—145 | .. | 3 2 1 |
| 15,000 | 5 | " | 8 | Do. do. 1879, £1 pd. | 1¼—1½ | .. | 4 11 5 | 200,000 | " | Sept. 14 | 3 | Do. 3 p. c. Deb. | 97—99 | .. | 3 0 7 |
| | | | | | *Ex. div. | | | | | | | | *Ex div. | | |

impossible to use it. What really troubled communities was the insisting on so high an illuminating power. Just now gas in Dundee must be of about 22-candle power, and there was a struggle to keep it at that; owing to the difficulty of getting cannel coal. Some places used carburetted water gas for enriching; but when he asked the Council some years ago to consider this matter he was told it was poisonous, although it was used in London, and he never heard of anyone being poisoned by it. In Belfast it was also largely employed. The position in Dundee was that the capital on the works was about £370,000; and by the time the reconstruction was carried out, it would probably be £500,000. Mechanical stoking was being adopted in Dundee; and the saving was expected to be about 2s. per ton of coal, which meant something like £6200 a year. But to bring about this method required £80,000; so that they needed to provide £4000 for interest and sinking fund, which would have to be deducted from the £6200. If the Council insisted in carrying out their present policy—putting aside out of revenue £4000 for extensions—this would make £8000 a year, or a loss of about £2000. There was not very much economy in this. His contention was that they were not called upon to put aside the £4000. If this generation were to pay for all the reconstruction out of revenue, it would be paying for futurity, which it should not do. As to how to cheapen the price of gas, he would adopt the incandescent method, which required heat to give light, and not gas with a high illuminating power. Fourteen-candle power gas would be sufficient. Then they would be able to use gas for cooking purposes at a great deal less cost than coal. The public incandescent lamps burned 3 cubic feet of gas per hour, while the others consumed 2 feet. But the illuminating power of the former was 80 candles, and of the latter 12 candles. Where would the hardship be, if the Council were to say that in May next they would reduce the quality of the gas to 15 or 16 candle power? This would give the consumers plenty time to get the new lights ready. Most of them would do it; but the others could maintain the present power by adding a third to the size of their present burners. This was where the relief was to come from. Mr. Brownlee's view, it will be seen, is much the same as is expressed in the special article to which I have referred. The underlying idea of both is that the Gas Commissioners should have regard for the present, and let futurity look after itself. This is not a wise policy; and if the Dundee Gas Commissioners adopt it, they will do a lasting injury to the cause of gas lighting in the city.

At a meeting of the Gas and Water Committee of the Dundee Town Council, on Thursday, a letter from the Dundee Trades Council was submitted, which asked that an investigation be made into the reason why gas is dearer in Dundee than it is in other towns. The Committee requested the Engineer and Manager (Mr. M'Crae) to bring up a report on the subject.

In Greenock there is more reason for complaint than there is in Dundee, because there there has been a real, palpable deficit, which, to all appearances, might have been prevented. The situation was explained at a meeting of electors last night. Mr. Hugh Shearer said that the past year closed with a deficit of £2606, which was accounted for by the increase in the price of coal, the increased rate of wages, and sums expended for the purchase of gas-meters and for main and service pipes. The increase of 5d. in the price of gas would be temporary, as to all appearance coal had reached its highest point. Treasurer Swan did not seek to defend anything that had been done; but, as Treasurer, he thought it his duty to submit one or two favourable features in connection with the department, pretty much because of the fact that it had got into what he might call disfavour. Referring to the indebtedness of the Trust, he mentioned that in 1874, when the Inchgreen works were started, the total indebtedness was £147,447; to-day the total indebtedness was £69,398. Something like £80,000 had been paid by the Trust during past years to the Police Board, to prevent the increase of taxation. The Trust had not only reduced by more than half its original indebtedness, but had handed over a larger sum than would have fully relieved it of all debt to the Police Board towards the reduction of general taxation. One other favourable feature was the fact that, notwithstanding what had been done, they had continued to reduce the price of gas. Regarding last year's unfortunate deficit, he thought one-half of it might be accounted for by extra meters and service-pipes. Treasurer Swan proceeded to explain how these items had been charged in a different manner from that of previous years; and he also mentioned that unfulfilled coal contracts had helped to create the deficiency. In reply to a question, Mr. Shearer said that the discrepancy in the late Collector's department had been found to be £609, and that he could not tell when the irregularities commenced. It is highly probable that not much more will be heard of this "regrettable incident" at Greenock; but a good deal will depend upon the extent to which the Police Board give their Manager a free hand in his working.

In connection with this subject, a Greenock ratepayer puts some questions to Messrs. Mitchell and Anderson, members of the Corporation, who seem to have agreed to give little or no information on the important question of the gas accounts. In the first place, he asks if it is true that the Committee who were appointed to inquire into the accounts, reported that more than £600 was lost to the town because the coal contracted for had not been delivered. And, further, did the Convener not receive a report from the officials, giving particulars of the amount of unfulfilled contracts, before he purchased the large quantity of coal he tried to get credit for? Again, what action did he take to compel the fulfilment of the contracts? Secondly, on the 18th of September, Mr. Mitchell moved that the correct position of the gas accounts "shall be disclosed." Since that date the Yellow Book has been issued, and in the ratepayer's opinion, the true state of the accounts is not disclosed. As proof, he refers Mr. Mitchell to the place where open accounts are put down at £2561; and included therein is more than £600 said to have been paid to the collector, and not placed to the credit of the town. He asks where this sum went, and if it is fair to charge to an open account money received. Plying his questions further, he asks if it is an honest system of keeping accounts to say that an item "shall be disclosed," and afterwards issue a printed statement signed by the Treasurer, the Auditor, the Convener of the Gas Committee, and the Provost, wherein a large sum is not so disclosed. Lastly, he inquires what steps have been taken to get the parties responsible to pay the sum still due.


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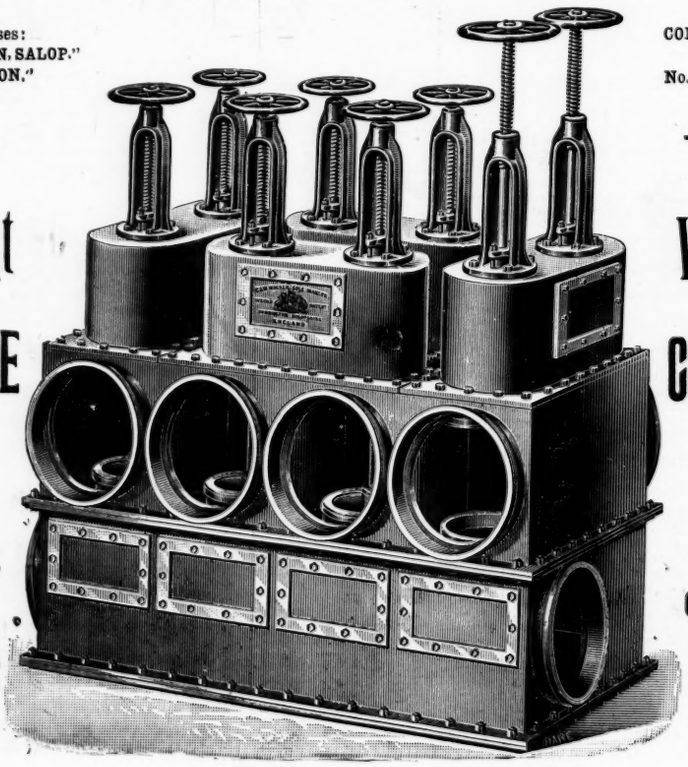

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Mr. R. Hamilton, Inspector of Lighting for the City of Glasgow, knows more about public lighting than any other man in Scotland. He is very favourable to lighting by incandescent gas—being in this respect unlike some who look upon the extra trouble of the system, as compared with ordinary gas lighting, as an insuperable obstacle to its adoption. At a meeting of the Town Council this week, a report by Mr. Hamilton was submitted, upon the lighting of Great Western Road. Dealing with the portion of the thoroughfare between Kelvin Bridge and Hyndland Road, he reported that the present annual cost for gas, labour, and repairs on account of 138 lamps is about £367; that to alter the lamps to the incandescent system would cost about £200, and the annual charge would be about £450; and that to light with electricity would cost £1050, and the annual charge would be about £900. The recommendation of the Watching and Lighting Committee was that part of the distance—from Hyndland Road to Horselethill Road—be lighted by incandescent gas-lamps as an experiment. In the Council meeting, Mr. Primrose explained that the Committee were adopting this experiment with a view to showing the relative values of electric lighting and incandescent gas lighting. The Committee felt perfectly satisfied from experience, that incandescent gas would play a very important part in the lighting of the city. The Council adopted the recommendation of the Committee.

At the Edinburgh Town Council this week, it was reported by the City Analyst (Dr. J. Falconer King) that the illuminating power of the gas supplied to the city from the Edinburgh works on the 9th inst. was 26·90 candles, and from the Leith works 21·70 candles. Mr. Balfour, who lives in a district which is served from the Leith works, asked what was the explanation of the low illuminating power of the gas made in Leith. Mr. Purves explained that in Leith the plant was very much worn out, and required to be pressed rather more than it should be. They were, however, using the best coal, and doing everything they could to keep up the quality of the gas made there. I daresay the Gas Commissioners are anxious not to expend more money upon the Leith works than they can help, because of their intention to close them as soon as the new works at Granton are ready for use. There is no plant in the Leith works for enriching; and therefore, unless dearer coal is used than in Edinburgh, the gas must be of lower illuminating power.

Cambuslang is a growing suburb of Glasgow. Its gas supply is in the hands of a limited liability Company, which is managed by Mr. Robert Simpson. So rapid has been the growth of the place, that the Gas Company have found it necessary to expend about £8000 upon extensions at the works—chiefly in laying down new plant which will make the undertaking capable of a yearly output of 80 million cubic feet, or double the capacity of a year ago. Among the extensions are a gasholder of 250,000 cubic feet capacity, and a new exhauster to pass 28,000 cubic feet per hour.

**Accident to a Gasholder at Barking.**—Barking was deprived of a supply of gas for some time last Thursday evening owing to an accident to a holder at the gas-works. The holder became jammed and tilted, with the result that one side was torn, and the holder seriously damaged.

## CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Oct.* 20.

**Sulphate of Ammonia.**—The activity disclosed last week has been sustained; and not only has a good business again been transacted, both for prompt and forward delivery, but a further advance in values has been established. Quotations for prompt delivery are now about £10 15s. f.o.b. Leith, £10 13s. 9d. f.o.b. Hull, and £10 15s. to £10 17s. 6d. f.o.b. Liverpool. Some increase is quoted for delivery up to the end of the year; and, in this position, sales are reported to have been made in London at £10 17s. 6d., Beckton terms—quotations being now raised to £11. For delivery over the early months of next year, £11 to £11 2s. 6d. per ton f.o.b. at the ports, on ordinary terms, has been realized. The satisfactory feature in the situation remains that buyers have been willing to accord a premium for forward delivery; thus showing confidence in the future of the market.

**Nitrate of Soda** is firm on spot and dearer for shipment, owing to the combination being now regarded as a *fait accompli*. Spot quotations are 8s. 1½d. to 8s. 3d. per cwt. for ordinary, and 8s. 6d. for refined, quality. October-December shipment is quoted at about 8s. 9d.

LONDON, *Oct.* 20.

**Tar Products.**—There is no improvement in this market; and although a fairly active business is being done as regards deliveries, prices generally have a drooping tendency—benzol being the exception, the surplus production of which is now being absorbed in other directions than aniline making. Curiously, 90's are stronger than 50's, which is a reversal of the conditions which have prevailed for some time. Carbolic acid is in a wavering state. Some English dealers will have it weaker. On the other hand, foreign buyers are disposed to pay more money. Most producers, however, are well contracted; and the present see-saw position of the article does not interest them much. Naphthalene is moving off readily; and there are more forward inquiries. Much lower prices are being paid for tar, while anthracene still continues neglected.

The average values during the week are: Tar, 14s. 6d. to 21s. 6d. Pitch, east coast, 36s.; west coast, 33s. Benzol, 90's, 10½d.; 50's, 1s. Toluol, 1s. 2½d. Solvent naphtha, 1s. 2d. Crude naphtha, 4½d. Heavy naphtha, 1s. Creosote, 1¾d. Heavy oils, 3d. Carbolic acid, 60's, 2s. 9d. Naphthalene, 75s.; Salts, 45s. Anthracene, nominal, "A," 3¾d.; "B," 2¼d.

**Sulphate of Ammonia** has taken a turn for the better. In all positions, higher prices are being asked. A large business is reported to have been done at £10 12s. 6d. per ton; but to-day's value may be taken at £10 15s., less 3½ per cent., with an advancing market.

In reference to the proposed purchase of the Newtown Gas-Works, the District Council last Friday passed a resolution that notice to treat be served at once on the Company.

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## COAL TRADE REPORTS.

**From Our Own Correspondents.**

**Lancashire Coal Trade.**—The position generally throughout the coal trade of this district remains without any very material change. All descriptions of round coal are still moving away steadily. The better qualities of engine fuel also meet with a fairly good demand; and there is still comparatively very little accumulating in stock at the Lancashire collieries. In some quarters, a strong inclination is expressed in favour of a further advance in prices at the earliest possible moment; but for the present at least this is not likely to receive sufficient support on the part of the leading collieries in the Manchester district, and unless they were prepared to act in co-operation with the West Lancashire Coal Sales Association it is scarcely likely that any independent move with regard to prices would be made. The position in some of the neighbouring large mining districts is also such as scarcely to favour any upward move in prices just now. Although Lancashire collieries have not much surplus output hanging on their hands, there are evidently fairly large quantities, both of round coal and engine fuel, that are not meeting with at all a ready sale in Yorkshire, Staffordshire, and Derbyshire; and these are being offered here at considerably below local quotations. Very much will depend upon the character of the ensuing winter season, as to the future course of prices. Judging, however, from surrounding districts, and the undoubted slackening off in many of the large coal-using industries, the position, taking it all through, is scarcely so strong as it has been. The absence of stocks, however, is in itself a matter of serious concern for the immediate future, and for the next two or three months at least is likely to operate against any appreciable easing in prices; while there is the not at all improbable contingency that an exceptionally severe winter might temporarily bring forward a further upward move in round coals. Pit prices for the present remain very firm at 16s. 6d. to 17s. 6d. per ton for best Wigan Arley, 15s. to 15s. 6d. for Pemberton four-feet and seconds Arley, 14s. to 14s. 6d. for common house coal, 12s. 6d. to 13s. for steam and forge coals, and 8s. 6d. and 9s. for inferior to 10s. 6d. and 11s. for the best sorts of engine fuel. The shipping trade continues fairly active; and good prices are still being obtained for round coals delivered at the ports on the Mersey—ranging from 16s. to 16s. 6d. per ton for ordinary steam coal, up to 17s. 6d. and 18s. for house-fire qualities, delivered at the Garston Docks or the High Level, Liverpool. Foundry qualities of coke continue in active demand, and are well maintained at late rates. Furnace descriptions, however, are only in moderate request for iron-making purposes, and the tendency of these is undoubtedly in a downward direction; some qualities having dropped fully 5s. to 6s. per ton below recent maximum rates.

**Northern Coal Trade.**—Lower prices have been quoted of late for coal, as the result of the lessened demand from the north, and also of some scarcity of steamers for shipping the fuel. In the steam coal trade, this is rather marked. Best Northumbrian steam coals are now obtainable at from 17s. 6d. to 17s. 9d. per ton f.o.b., second-class steams are about 17s., and steam smalls are 10s. 3d. to 10s. 6d.; but there is some fluctuation, according as cargoes are needed. For occasional sales of gas coals, the great companies of Durham now ask about 17s. 6d. per ton f.o.b., which is about 1s. 6d. per ton above the average price paid for supplies under contract. The production of the collieries seems rather better than it was a month or two ago. The coke trade is generally rather quieter; and best Durham coke for export is from 27s. 6d. to 30s. per ton f.o.b. Blast furnace coke is about 26s. per ton on Teesside. There is an increased production of gas coke; but it seems to be well taken up. The price quoted is still from 24s. to 25s. per ton f.o.b. At the time of writing, there are rumours that some contracts have been entered into for gas coals for the Continent for three years, at about 13s. 6d. per ton f.o.b.

**Scotch Coal Trade.**—There is a general expectation among buyers that prices are about to come down. Sellers, on the other hand, anticipate an advance. Meantime, the quotations which are given show no change in prices; but it is believed that better terms can be had than they disclose. There is a large output, which, however, could be nearly doubled if the men would work full time. The demand is such that there is hardly any coal in stock anywhere. Prices quoted are: Main 15s. to 15s. 3d. per ton f.o.b. Glasgow, ell 15s. 6d. to 16s. 6d., splint 16s. 6d. to 17s. The shipments for the week were 240,567 tons—an increase of 24,509 tons upon the previous week, and of 44,526 tons upon the corresponding week of last year. For the year to date, the total shipments have been 8,707,948 tons—an increase of 1,712,121 tons over the same period of last year.

**Hythe Town Council and the Gas-Works.**—The Hythe Town Council consider the present time opportune to purchase the undertaking of the Gas Company; and they have given the Town Clerk instructions to enter into negotiations with the Company, to ascertain if they will meet the Corporation with a view to purchase by private treaty.

**The Issue of Gas Stock to Consumers.**—The Crystal Palace District Gas Company are offering an issue of £20,000 of ordinary stock to their consumers, under the authority conferred by the Company's Act of 1893. In 1896, £20,000 of stock was successfully placed among the Company's customers. The new issue may be taken by them in amounts of not less than £5, or multiples thereof, at the low price of £112 per cent., at which rate it will yield the investor about £4 9s. 3d. per cent. The continuous increase in the Company's business renders necessary this further issue.

**Keighley Corporation Gas Supply.**—The Gas Committee of the Keighley Corporation, on making up their accounts for the year ending June 30, find the consumption to have increased so largely—by about 13 million cubic feet—that, instead of £1000 which it was proposed to hand over out of the profits for the relief of rates, they are in a position to recommend £3000. But in the current year the cost of coal will be about £8800 more than usual; while the 3d. per 1000 cubic feet increase to the consumer only represents a return of one-fourth that amount. The better prices realized for tar and other residuals will still leave a large difference.


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**The Lighting of Ascot.**—The cost of lighting the village of Ascot by gas is paid out of a fund raised entirely by voluntary subscriptions. The Lighting Committee have just issued a balance-sheet, which shows the amount collected for the first year to be £37 1s. 6d.; and there is a balance in hand of £19 12s. It is proposed this year to have the lamps lighted during the six winter months, instead of only three months as was done last year, and to increase the number of lamps.

**New Capital for the Redhill Gas Company.**—The Directors of the Redhill Gas Company have been authorized by the shareholders to raise additional capital by the creation and issue of £7500 of ordinary stock under the provisions of their Act of this year, and to exercise the borrowing powers possessed under the Act. The latter will be effected by the creation and issue of 4 per cent. debenture stock. The Company have been spending a good deal of capital lately, and are putting the concern into a thoroughly sound and efficient state. According to the Chairman (Mr. H. Stenning), some of the money which they are going to expend now ought to have been spent several years ago.

**Mansfield Gas Supply.**—At the last monthly meeting of the Mansfield Town Council, a letter was read from the Local Government Board enclosing sanction to the borrowing of £6100 for gas-works purposes, and inquiring under what statutory authority the Town Council proposed to purchase the undertaking of the Mansfield Woodhouse Gas Company and to borrow the purchase-money. It was resolved to refer the Board to the provisions of the Mansfield Commissioners' Gas Act, 1878. It was also decided that in the Bill proposed to be promoted by the Corporation next session, that Act should be amended so that modern provisions as to the repayment of loans should be substituted for those existing, and that amendments should also be inserted with a view to the provisions as to borrowing and repayment of all further loans for gas purposes being governed by the proposed Act only.

**Provision of Artisans' Dwellings by the Southampton Gas Company.**—Last Tuesday, Lieut.-Col. A. C. Smith, R.E., one of the Inspectors of the Local Government Board, held an inquiry relative to the Southampton Gas Company's scheme for providing a number of artisans' dwellings in connection with the widening of one of the streets. Among those present were Mr. C. Crowther-Smith, the Secretary, and Mr. S. W. Durkin, the Manager. Mr. Crowther-Smith explained that in 1898 the Company went to Parliament for the purpose, among other things, of obtaining compulsory power to acquire certain houses for their business. The freeholds of the houses having been obtained, it was proposed to demolish them in order to extend the works. The number of tenements was 21, and the number of residents 81; but only 75 could be designated as of the labouring class, for whom it was intended to provide under the Company's scheme. The land upon which it was proposed to build the substituted houses was within a mile of the present dwellings; and, as far as could be found, within the same distance of several occupations of the residents, most of whom were employees of the Company. The scheme would provide palaces for persons who were now practically in hovels. The Inspector put a number of questions regarding the plans, and other details, and the inquiry then terminated.

**A Joint Water Board for Ilkeston and Heanor.**—The water supply of the Heanor district has for many years been a troublesome question; and several trials and schemes have proved worthless. The Smalley scheme was the last venture; and now, after an expenditure of (it is stated) some £6000, failure has had to be acknowledged. Messrs. Hodson have brought forward a project for the supply of the district from Meerbrook Lough; and they suggest that the authorities of Ilkeston and Heanor should form a Joint Board. Both authorities appear to have jumped at the idea, and members have already been selected to serve on the Board. Steps are to be taken forthwith to promote a Bill in Parliament.

**The Wages of Newcastle Lamplighters.**—The lamplighters employed by the Newcastle and Gateshead Gas Company are agitating for an advance in wages and improved working conditions. On Oct. 10 last, Mr. T. Waddom, the Secretary of the Company, sent a letter to the men's Union, stating that the Company were unable to entertain the request for an advance, and remarking that the Newcastle men were better paid than those in some provincial towns. The men, at a meeting on Monday last week, decided that, unless the Company meet a deputation of them within fourteen days, a week's notice to terminate their engagements would be tendered. The gas stokers, it is stated, have agreed to support the action of the lamplighters. It is only about three years since that the lamplighters employed by the Company obtained an advance of wages.

**Combating the Electric Light in Canterbury.**—Readers of the "JOURNAL" are aware that the Canterbury Corporation have an installation of electric lighting for which they are endeavouring to secure the support of the citizens. Those of them who do not mind paying for the luxury will possibly be led to adopt the new illuminant; but the Directors of the Gas and Water Company are determined that none of their customers shall do so without being fully informed as to the economy and utility of gas. Their new Engineer (Mr. H. C. Page) is sending to all the consumers using ordinary meters a circular setting forth the advantages obtainable from the usual as well as from the incandescent system of lighting. They point out that gas is very much cheaper than any other illuminant; that by it the maximum lighting effect is obtained at the minimum cost; and that it can be used for heating and cooking purposes. In order that the class of consumers specially addressed may derive the fullest advantage from the incandescent system, the Company will fix incandescent burners according to a scale of prices submitted, without any charge for labour. They urge upon the consumers the importance of keeping the burners free from dust, and the chimneys and globes clean, and of having the mantles renewed when requisite. With the view of relieving the consumers of trouble in this respect, the Directors are prepared to enter into contracts to keep in repair all their incandescent burners for one year at extremely low quarterly rates. With the facilities thus afforded for installing the incandescent gas system, and using it under the most favourable conditions, the citizens of Canterbury will do well to carefully contrast its advantages with those put forward for the electric light.


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**Winding Up the Brigg Gas Company.**—The final meeting of the Brigg Gas Company has been held. The Liquidators appointed on the works being taken over by the District Council presented a statement showing how they had dealt with the cash in their hands. About £24,000 has been divided among the shareholders for their capital of £10,000; and the Directors and some of the workmen have been given an honorarium. Formal resolutions terminating the existence of the Company were passed.

**Prestatyn Water-Works.**—The District Council of Prestatyn have decided to proceed for parliamentary powers to acquire, by compulsion or otherwise, the water-works owned by Mrs. M'Laren, wife of Mr. C. B. M'Laren, M.P. The works were established a few years ago at a cost of more than £3000; but, during the past two years, the supply of water has become inadequate, as Prestatyn has almost doubled its population, and is rapidly becoming, with its hilly background and spacious sea front, an attractive watering place.

**Burslem Corporation Gas Supply.**—At the last monthly meeting of the Burslem Town Council, the minutes presented by the Gas Committee contained a recommendation that application should be made to the Local Government Board for sanction to borrow £31,000 for 30 years for the purposes of the gas undertaking. Mr. Owen, in moving the adoption of the minutes, said, with regard to a paragraph stating that 960 new cooking-ranges and 37 grillers had been fixed since the 31st of March, that this was a tremendous increase. There had been an increase in the consumption of gas every month as compared with the corresponding months of previous years; and this had been going on for a long time. The policy of the Committee had redounded to the prosperity of the undertaking. They were now going to apply for a loan of £31,000 in order to complete the extensions at the gas-works. He remarked that some people had occasionally been able to obtain gas from the automatic meters without previously putting a penny in the slot. The Committee had thought it their duty to give notice that they should demand payment for gas consumed in such cases. The minutes were passed.

**New Joint-Stock Companies.**—A Company has been registered with a capital of £15,000, in £10 shares (600 preference), to acquire the undertaking carried on at Brettell Lane, Staffordshire, as Trotter, Haines, and Corbett, and to carry on the business of brick, tile, and pipe manufacturers and merchants, clay merchants, and dealers in building materials of every description. The Standard Acetylene Gas Company, Limited, has been formed with a capital of £20,000, in £1 shares, to acquire certain patents for improvements in acetylene gas generators; to adopt an agreement with the London and Northern Syndicate; to manufacture and supply generators, lamps, and installations for acetylene gas; and to deal in carbide of calcium, oxides, &c. The Spanish Kern Burner Company, Limited, has been registered with a capital of £15,000, in £1 shares, "to acquire the benefit of certain patents relating to the manufacture of incandescent gas-burners for Spain, Cuba, Porto Rico, and Portugal, and to carry on the business of manufacturers and suppliers of gas-burners, incandescent lights, and other apparatus for increasing the illuminating or heating power of gas."

**A New Reservoir for the Weardale and Shildon Water Company.**—In consequence of the constantly growing demand for water in the district supplied by the Weardale and Shildon District Water Company, the Directors have deemed it expedient to take the preliminary steps towards the construction of a large impounding reservoir in Upper Weardale. Steps are being taken to obtain in the next session of Parliament powers for this purpose.

**The Wigton Rural District Council and the Overwater Scheme.**—The members of the Wigton Rural District Council were specially summoned to a meeting last Tuesday for the purpose of reconsidering the Overwater and Head of Ellen scheme, to which reference has been already made in the "JOURNAL." At a meeting held a month ago, the Council failed to secure a majority in favour of participating in the scheme; but it was subsequently decided to look further into the matter. After some discussion, the scheme was adopted by 19 votes to 8. It now awaits the sanction of the ratepayers.

**Fire at the Bognor Water-Works.**—A serious fire occurred last Wednesday afternoon at the Bognor Water-Works, resulting in the complete destruction of the engine-shed at the pumping-station, which is situated about five miles from the town. Shortly after one o'clock, a workman noticed that a mat near the oil-engine was on fire. The flames spread rapidly; and the oil becoming ignited, the building was ablaze in a very short time. Fortunately, at the time of the conflagration the reservoir contained a considerable quantity of water, and this, with the possibility of securing almost immediately a supply by means of an auxiliary pump, removed any danger of interruption of the service.

**Ripon and the Laver Water Scheme.**—At a special meeting of the Ripon City Council, held in Committee last Thursday—the Mayor (Mr. Wilkinson) in the chair—the question was discussed as to the advisability of seeking parliamentary powers to secure a supply of water from the River Laver above the present Lumley Moor works; this action being necessary in view of the Leeds Corporation resorting to the same source, though from a different tributary of the river. The Council resolved to promote a Bill with a view to extending the Lumley Moor scheme to the Laver; Mr. Charles Hawksley being engaged to prepare plans and report. It may be mentioned that as far back as 1893 Mr. Hawksley suggested that any extension of the Ripon works would have to be in the direction indicated.

**Kingsbridge Water Supply.**—By a majority of eleven votes to one, the Kingsbridge District Council decided on Tuesday last to proceed with the scheme formulated by Messrs. Taylor, Sons, and Santo Crimp for obtaining a supply of water from Place Moor, to which reference was made in the "JOURNAL" for the 9th inst. (p. 914). Mr. G. Saunders, the only opponent of the scheme, was in favour of further steps being taken to procure water from the Borough Estate, and contended that in the Capton Valley, from which it was now proposed to derive a supply, the conditions as to the cultivation of the land were similar to those which led to the rejection of the Borough scheme by the Local Government Board. The Chairman (Mr. J. S. Hurrell) said he believed the scheme alluded to was impracticable, and would cost more than that now before them.


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| WINDSOR ST. WORKS, BIRMINGHAM | 2,000,000 |
| SALTLEY WORKS, BIRMINGHAM | 2,000,000 |
| COLCHESTER | 300,000 |
| BIRKENHEAD | 2,250,000 |
| SWINDON (New Swindon Gas Co.) | 120,000 |
| SALTLEY, BIRMINGHAM (Second Contract) | 2,000,000 |
| WINDSOR ST., BIRMINGHAM (Second Cont.) | 2,000,000 |
| HALIFAX | 1,000,000 |
| TORONTO | 250,000 |
| OTTAWA | 250,000 |
| LINDSAY (Remodelled) | 125,000 |
| MONTREAL | 500,000 |
| TORONTO (Second Contract; Remodelled) | 2,000,000 |
| BELLEVILLE | 250,000 |
| OTTAWA (Second Contract) | 250,000 |
| BRANTFORD (Remodelled) | 200,000 |
| ST. CATHERINES (Remodelled) | 250,000 |
| KINGSTON, PA. | 125,000 |
| PETERBOROUGH, ONT. | 250,000 |
| WILKESBARRE, PA. | 750,000 |
| ST. CATHERINES (Second Contract) | 250,000 |
| BUFFALO, N.Y. | 2,000,000 |
| WINNIPEG, MAN. | 500,000 |
| COLCHESTER (Second Contract) | 300,000 |
| YORK | 750,000 |
| ROCHESTER | 500,000 |
| KINGSTON, ONT., | 300,000 |
| CRYSTAL PALACE DISTRICT | 2,000,000 |
| DULUTH, MINN. | 300,000 |
| CATERHAM | 150,000 |
| LEICESTER | 2,000,000 |
| ENSCHEDE (HOLLAND) | 150,000 |
| BUENOS AYRES (RIVER PLATE CO.) | 700,000 |
| BURNLEY | 1,500,000 |
| KINGSTON-ON-THAMES | 1,750,000 |
| ACCRINGTON | 500,000 |
| TONBRIDGE | 300,000 |
| STRETFORD | 500,000 |
| OLDBURY | 300,000 |
| TODMORDEN | 500,000 |
| SALTLEY, BIRMINGHAM (Third Contract) | 2,000,000 |
| YORK (Second Contract) | 750,000 |
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| NEWPORT (MON.) | 250,000 |
| TOKIO, JAPAN | 1,000,000 |

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

**Expenditure on Public Lighting in London.**—According to a return just issued, showing, among other things, the amount of the expenses incurred during the year ending the 31st of March last by certain Metropolitan and Suburban Sanitary Authorities, under the Public Health (London) Act, 1891, the total amount expended in this way, out of the £253,815 received from the London County Council, under the Equalization of Rates Act, 1894, was £214,894. The largest share of this sum—£25,159—was spent by Islington; the next highest amounts being as follows: St. Pancras, £18,168; City of London, £17,681; Wandsworth, £16,561; Camberwell, £15,808; Lambeth, £14,663; Shoreditch, £10,525; and Hackney, £10,292.

**Professor Lewes's Evidence before Mr. Oldroyd's Committee.**—Readers of our report of the proceedings of the Committee of the House of Commons to whom were referred the Gas Bill of the London County Council and the Bills of the Gaslight and Coke and South Metropolitan Gas Companies will recollect that some important evidence for the last-named Company was given by Professor Lewes, the Gas Examiner to the Corporation of London. Though, as stated in the "JOURNAL" at the time, Professor Lewes attended before the Committee on a Speaker's order, his conduct in so doing, without the consent of the Corporation, was questioned by Mr. Alpheus C. Morton, a member of that body, who moved for an inquiry into the matter. It was accordingly referred to a Committee, who reported at the meeting of the Common Council last Thursday. They stated that they had heard a statement from Professor Lewes, seen a copy of the Speaker's order, and had before them Mr. Morton; and, after considering the whole question, they had come to the conclusion not to take any action in the matter. Mr. Morton expressed his dissatisfaction; but the report was adopted.

**The Wolverhampton Gas Company's Stokers and Inclined Retorts.**—The members of the Wolverhampton branch of the Gas Workers' Union employed at the Stafford Road Gas-Works held a meeting last Tuesday, when two important questions were brought under discussion—the first being an advance of wages for the men employed at those works. The men think they are entitled to more money to compensate them for the extra cost of living and firing. The other question was an alteration in the work of the men at the inclined retorts. They have given the new plant twelve months' trial, and find that the amount of work allotted to each is far too much for one man to perform for any length of time and do his duty to his employer and himself. It appears that there has been a grievance in connection with this branch of work since November last year; but some of the men asked the others to give the work a fair trial, and they are ready and willing to show they are doing more work on the inclined retorts than are men at other places. At a meeting some time ago, they applied to their General Secretary from Birmingham, to ask the Directors of the Gas Company to meet a deputation of the men to discuss the two questions; and the application was sent in some nine or ten weeks ago, but has not yet been replied to. The men are dissatisfied at this silence, and at the meeting last Tuesday it found expression in very strong remarks; and the General Secretary was instructed to take what action he thinks best to enforce their fair and just demands.

**Public Lighting Difficulty at a Lancashire Pleasure Resort.**—The Directors of the St. Anne's-on-the-Sea Gas Company have offered for sale the lamps at present used for the lighting of the public streets; and if a customer is found, they will be taken down. As the electric lighting scheme of the District Council is not likely to be completed until next summer, there is every prospect of the town being without light in the streets during the winter nights. The present difficulty has arisen through the St. Anne's Council refusing to buy the lamps from the Company for use in the electric light installation.

**Proposed Improvement of the Tiverton Water Supply.**—The scheme for the improvement of the water supply was further considered at a meeting of the Tiverton Town Council on Wednesday last. Owing to conditions imposed by the owner of the land through which the leat passes, it was decided not to proceed with this part of the scheme. The Surveyor (Mr. J. Siddalls) submitted an alternative proposal for piping certain springs into the leat, so as to increase the supply in summer; but he pointed out that this would do nothing to ensure the purity of the water, which was the primary object of the original scheme. The Council rejected the proposal, and decided not to make one of the suggested storage reservoirs, because in this case also conditions were put forward which were regarded as too onerous. All that remains of the original scheme, therefore, is a covered reservoir which is to be built at a cost of £1600.

**"Science" in the Daily Press.**—The East, as we know on good authority, is the quarter from which wisdom emanates; and therefore we reproduce from the "East Anglian Daily Times" the following description of the installation of compressed gas lighting which Messrs. William Sugg and Co. have recently completed at the point in the Strand where this crowded thoroughfare is crossed by Wellington Street, to which reference was made in our editorial columns last week. As an example of lucidity, scientific accuracy, and poetic afflatus combined, it is worthy of preservation: "An interesting demonstration of new lighting was made in the Strand this evening [Oct. 15], where four empores of traffic meet at Wellington Street. It is a development of Suggs' patent, and the result is produced by a combination with the sunlight incandescent mantle. The gross result is a luminant from the four lamps equal to 6000-candle power. The pure gas in the Sugg apparatus is precipitated by hydraulic pressure up to nine inches, against four inches in the previous highest possible. The firm have orders extending the lighting up to the City and down to Parliament Square. It is claimed for this combination that it is superior to electric lighting, because it is more solid and better distributed. Mr. Sugg claims to equal the sun, while the electric light is sister to the moon." We were immensely impressed with the word "empores," in the first sentence of the above paragraph—it is so uncommon, and withal so expressive. Others have been equally struck with it, for it has been faithfully reproduced by several of the papers in which the paragraph has appeared. Others, however—the "Liverpool Courier" among the number—have spoilt the beauty of the opening lines by substituting the word "course." The "Pall Mall Gazette" described the new light as a "blowpipe applied to an incandescent burner;" the result being "an improved gas."

"THE TRIUMPH"

*"Let us enquire in a spirit of love, what is 'Triumph'?"*

*"BLEAK HOUSE."—Adapted by RICHMOND'S.*

**The Cumberland Water Scheme.**—At a meeting of the Wigton Rural District Council last Tuesday, a second attempt was made to pass the Overwater and Head of Ellen water scheme. After a lively discussion, a resolution in favour of joining the Aspatria and Holme Cultram authorities in the promotion of a Water Bill was carried by a majority of one.

**Harrogate Water Scheme and the Ripon Rural District Council.**—The Ripon Rural District Council have decided to co-operate with the Harrogate Corporation in their project to take water from the River Burn—the pipe-track being through the Ripon rural district. On behalf of the Corporation, representatives promised the District Council that, if they would support the scheme, water should be supplied in bulk at 6d. per 1000 gallons to any hamlet, village, or township in their area.

**The Price of Coal and French Finance.**—A Reuter telegram from Paris, published in the "Financial News" last Tuesday, said: "The rise in the price of coal, attributed here partly to the British armaments for the war in South Africa and partly to the mining strikes in America, will have a direct and considerable effect on the French Budget for 1901. The Minister of Finance has informed the Budget Committee that he has found himself compelled by this cause to modify his estimates, both of revenue and expenditure. While the railways whose minimum rate of interest is guaranteed by the Government want 1,000,000 frs. more, the revenue from railways which share their profits with the Government shows a falling off of 1,200,000 frs. Besides this, the Minister of Marine has had to raise the amount required for coal for the Navy by 1,300,000 frs. The Budget is thus called upon, on account of the coal crisis, to bear a temporary surcharge of 3,500,000 frs."

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Mr. J. A. Purves, D.Sc., of Edinburgh, last week exhibited aëro-gas fountains, which have already been described in the "JOURNAL," in the Music Hall Buildings, Aberdeen.

The Bridlington Gas Company have placed an order with Messrs. Jonas Drake and Son, of Halifax, for the erection of a retort-bench of seven arches with regenerator furnaces on their patent tube principle.

Since taking up his duties as Engineer of the Canterbury Gas and Water Company, Mr. H. C. Page has introduced the Deacon waste-water meter system—fixing nine meters of various sizes, which have just been brought into use.

The "Daily Express" says "the correctly lighted apartment of to-day is not a glare of brilliancy, but has a harmonious arrangement of subdued tones, with a studied artistic effect, produced by an endless variety of tinted and decorated shades and globes. There is practically no limit to the range of such effects. The colour scheme in lighting forms an important art in house decoration."

Messrs. W. J. Jenkins and Co., Limited, of Retford, have just received a second order for a De Brouwer patent coke conveyor for the Gaslight and Coke Company, as well as for a large coke storage hopper from which carts and railway waggons can load without heavy labour.

An exhibition of Messrs. Fletcher, Russell, and Co.'s gas cooking and heating stoves and other appliances has been held at the West-End Assembly rooms, Newcastle-upon-Tyne, under the auspices of the Newcastle and Gateshead Gas Company. Free cookery lectures, with practical demonstrations, were given by Mrs. H. M. Young.

The Campbell Gas-Engine Company, Limited, have issued a revised catalogue and price list of their gas-engines, for which, together with their oil-engines, they have been awarded a gold medal at the Paris Exhibition. The ordinary horizontal engines range from 1½ to 130 brake-horse-power working load with coal gas, and from 1 to 110 with Dowson gas; the number of revolutions being 250 per minute for the smaller, and 160 for the larger sizes. The Company's horizontal engines suitable for electric light installations range from 2 to 100 brake-horse-power with coal gas, and from 5½ to 85 with Dowson gas; the number of revolutions being 280 for the smaller, and 160 for the largest size. All the engines above 5-horse power constructed for electric lighting purposes are fitted with an extra heavy fly-wheel and outer bearing. The engines are shown in combination with the Company's pumps; and the latter are also illustrated separately.

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[For Illustrated Advertisement, see Oct. 2, p. 864.]

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**JOHN ROMANS & SON, EDINBURGH,** Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application.
No. 30, ST. ANDREW SQUARE, EDINBURGH, } SCOTLAND.
NEWTON GRANGE, NEWBATTLE, DALKEITH, }

HYDRATED OXIDE OF IRON.

**PREPARED from Pure Iron.**
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

TO GAS AND WATER OFFICIALS.

**HIGH-CLASS Cycles at reasonable and** low Prices. Guaranteed for Twelve Months. Sent on approval. For Cash or Gradual Payment System. Send for Catalogue, Post Free.
MELROSE CYCLE COMPANY, COVENTRY.

**DRAWINGS, Tracings, and Specifica-** tions PREPARED and NEATLY EXECUTED, for Apparatus, Structures, or Extensions to Gas-Works, either designed or drawn to Engineer's Sketches by Draughtsmen of experience.
For Terms, apply, by letter, to No. 3568, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, a Situation to take charge** of Small Gas-Works, or as WORKING FOREMAN. Understands Engine and Exhauster, and can do small Fitting. Age 30. Good Reference.
Address A. HANCOCK, Gas-Works, Radstock, BATH.

CITY AND GUILDS EXAMINATIONS.

**MANAGER of a Gas-Works (First-class** Honours and Medallist) willing to HELP, BY CORRESPONDENCE, intending Students for next Exam.
Apply, by letter, to No. 3585, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**APPOINTMENT** desired by Traveller, SHIPPING AGENT, and FOREIGN CORRESPONDENT, accustomed to call on Gas and Water-Works Managers; or as SECRETARY or GAS-RENTAL ACCOUNTANT. Ex-Manager of Gas-Works.
Address No. 3577, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED**, a good Gas-Fitter. Used to Iron and Compo.
State Age and Wages required to the SECRETARY, Sheppy Gas Company, SHEERNESS-ON-SEA.

**WANTED**, a Gas-Fitter, one used to Iron and Compo. Wages 30s. per week. None but competent Men need apply.
Applications to Mr. L. G. HALL, Gas Engineer, RHYL.

**WANTED**, Two Gas Stokers, used to Shovel Charging. Permanency to steady, active Men. Wages 34s. per week.
Apply E. ONIONS, Engineer, Gas Offices, LOUGHBOROUGH.

FITTERS WANTED.

**TWELVE** additional Fitters required, used to Compo. and Barrel work. Must be quick and neat. Only good Men need apply.
Give References and Wages required to RICHMOND & CO., LIMITED, DUBLIN.

**FITTER** wanted at once. Steady, married Man, with good References (Abstainer preferred), used to Iron and Compo. Fitting and Main and Service Laying. Good Dwelling-House.
Only really capable Men need apply to the SECRETARY, Gas Company, Glastonbury, SOMERSET.

**WANTED**, a good Stoker, used to Shovel Charging, and Engine and Exhauster. Also a YARDMAN, to assist in Stoking when required, and to make himself generally useful. Must be steady and reliable Men.
Apply, stating Age, Wages required, and Particulars, to G. MOAT, Gas-Works, Purston, PONTEFRACT.

**WANTED**, at once, in a South-Coast Town Gas-Works, a thoroughly competent GAS-FITTER, well up in Iron and Compo. work, and able to do light Smithing. Permanency to a suitable and reliable Man.
Apply, by letter, stating Age, Experience, and Wages required, to No. 3583, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED**, a good Smith and Main LAYER, accustomed to Gas-Works. Also good GAS-FITTER for Prepayment Meter Installation work, with Compo. Permanent employment to suitable Men.
Apply, by letter, giving References and stating Wages required, to No. 3582, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED**, at a Country Gas-Works, two steady FOREMAN STOKERS, used to Shovel Charging, Generator Furnaces, and to Engine and Exhauster. Wages 36s. 2d. for Seven days. Twelve-hour Shifts, Day and Night alternately.
Apply, by letter, addressed to No. 3578, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C., stating the Weight of Coal the applicant will undertake to Carbonize, and the number of feet of Gas to make per Shift, including Furnace Work, the Wheeling in of Coal, and the Wheeling out of Coke.

**WANTED**, for Gas-Works in Brazil, an ASSISTANT MANAGER. Applicants must be well acquainted with the routine of management, and especially of Carbonization.
Preference will be given to Applicants having Experience of Electric and Incandescent Street Lighting and Generator Furnaces.
Salary £30 per month, with Apartments, Fuel, and Gas. Three Years' Engagement. First-class Passage out and home.
Apply, by letter, to No. 3576, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CITY OF BIRMINGHAM.

**THE** Secretaryship of the Gas Department will shortly be VACANT. Salary £1000 per annum.
Preliminary inquiries as to the duties of the Office should be addressed to the Secretary of the Gas Committee, Council House, Birmingham. Experience in the Financial and Commercial Management of a Gas Undertaking or of a large Manufacturing Business is desirable.
Copies of Applications for the appointment may be forwarded to members of the Gas Committee; but Candidates are earnestly requested to abstain from canvassing the members of the Council or of the Gas Committee.

**TO BE LET** on Hire—
FACING MACHINE, for facing *in situ* Self-Sealing Retort Mouthpieces any shape or size, ⊏, Oval, or Circular.
PULSOMETER, Size No. 5, with 4-in. suction and 3-in. delivery. Steam-Pipe ¾ in. diameter. Discharge 10,000 Gallons per hour.
Write J. WRIGHT, Bridge House, BLACKFRIARS BRIDGE, E.C.

**WANTED**, a good second-hand Gas-HOLDER TANK, either Cast-Iron or Steel. Not less than 43 ft. 6 in. inside diameter, and 18 feet deep. Must be in good condition.
Apply, by letter, to Mr. PERCY GRIFFITH, Assoc.M. Inst.C.E., 54, PARLIAMENT STREET, S.W.

**"CUTLER'S" Condenser**, ¾ million day, equal to new; weight 12 tons; accept £100 on rail, Berkshire, if sold promptly.
J. F. BLAKELEY, Thornhill, DEWSBURY.

**OIL-TAR.** Purchaser wanted for this Residual of Carburetted Water Gas. Delivery in the North of England; about 20 Casks at a time.
Address No. 3584, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**FOR SALE, Cheap**—One, Two, or Three PURIFIERS, 8 ft. square by 4 ft. deep, in good condition, with Valves, Connections, and Lifting Gear.
Apply to SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

**OFFERS** wanted for Second-hand CYLINDRICAL STATION METER to pass 12,000 cubic feet per hour.
Address GENERAL MANAGER, Enfield Gas Company, Enfield, MIDDLESEX.

HIGH-PRICED COAL.

**SMALL Gas-Works Authorities should** immediately adopt an EXHAUSTER, and thus make probably at least 750 cubic feet of gas more from each ton of Coal carbonized. Several small sets *in stock*, both New and Second-hand.
Address J. FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

**FOR SALE**—260 22 in. by 15 in. and 135 20 in. by 14 in. second-hand ⊏-shaped Retort Mouthpieces, fitted complete with Tangyes Patent Lids, 18 inches diameter.
Can be inspected on application to Mr. T. Hardie, Manager, Gas-Works, Redheugh, Gateshead-on-Tyne.
Offers to be addressed to the SECRETARY, 35, Grainger Street West, NEWCASTLE-ON-TYNE.

**GAS PLANT for Sale**—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

**FOR SALE**—Exhauster and Connections, Capacity 30,000 cubic feet per hour, and HORIZONTAL STEAM-ENGINE, 7-Horse Power, at the Gas-Works, Forfar.
Sealed Tenders to be lodged with William Gordon, Solicitor, Forfar, not later than the 27th of October, 1900.
The Corporation do not bind themselves to accept the highest or any offer.
Mr. James Baxter, the Manager, will show the Plant.

SCARBOROUGH GAS COMPANY.

FOR SALE.

**TWO 16 ft. by 6 ft. Lancashire Boilers.** Shell $\frac{7}{16}$-inch B Staffordshire, Double Riveted, Longitudinal Seams. Front and Back-End Plates $\frac{1}{4}$-inch Staffordshire B.B. complete, with all necessary Fittings and Connecting Piping. Insurance report 50.
The above Boilers are in first-class condition, and may be seen in position at the Gas-Works, Seamer Road, Scarborough.
For further Particulars, apply to
J. HOLLIDAY,
Engineer and Secretary.
32, Westborough, Scarborough.

PURIFIERS FOR SALE.

**THE** Directors of the Clayton, Allerton, and Thornton Gas Company are prepared to receive OFFERS for Four 12-feet square old PURIFIERS, with CENTRE-VALVE and 12-inch CONNECTIONS, LIFTING and TRAVELLING APPARATUS, and Two 12-inch RACK and PINION VALVES.
Also Two old PURIFIERS, 22 ft. by 8 ft., with 10-inch CONNECTIONS and Two Anderson 10-inch FOUR-WAY VALVES and Four 10-inch RACK and PINION VALVES and LIFTING APPARATUS.
The whole can be seen at the Company's Works in position, and to be pulled down and removed by the purchaser.
By order,
JOHN NIVEN,
Secretary and Manager.
Clayton, near Bradford,
Sept. 18, 1900.

**J. FIRTH BLAKELEY & CO., Thornhill,** Dewsbury, have FOR SALE:—
One Set of Three 6-ft. PURIFIERS.
One " Two 8-ft. "
One " Four 8-ft. "
One " Four 16-ft. by 12-ft. PURIFIERS.
Four 5-inch ANNULAR CONDENSERS.
Four 10-inch " "
Six 16-inch " "
"Cutler" ¾ million WATER CONDENSER.
Wrought-Iron TOWER SCRUBBERS, 3 ft. by 14 ft., 3 ft. 6 in. by 27 ft., and 7 ft. by 32 ft.
Cast-Iron TOWER SCRUBBERS, 3 ft. 6 in., 5 ft., and 6 ft. diameter.
EXHAUSTERS, 2000 to 60,000 Cubic Feet per hour.
"Holmes" & "Clapham" WASHER-SCRUBBERS.
"Livesey" & "Cripps" WASHERS.
4-in., 6-in., 8-in., and 10-in. STATION METERS.
Splendid GASHOLDER, 50 ft. by 20 ft.
RETORT IRONWORK, MODERN HYDRAULICS.
Telegrams: "BLAKELEY, THORNHILL LEES."

**FOR SALE**—Nine old Cast-Iron Gas-HOLDER COLUMNS.
For Particulars, apply to W. J. DOUGALL, Engineer and Manager, Gas-Works, SEVENOAKS.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

**THE** Gas Committee invite Tenders for the purchase of about 900 Tons of SPENT OXIDE.
Further Particulars and Form of Tender may be obtained from the Gas Engineer, Gas Offices, Bloom Street, Salford.
Sealed Tenders, endorsed "Tender for Spent Oxide," to be sent to me not later than Three p.m., on Wednesday, Oct. 24, 1900, addressed to the Chairman of the Gas Committee, Town Hall, Salford.
By order,
L. C. EVANS,
Town Clerk.
Town Hall, Salford,
Oct. 16, 1900.

ALDERSHOT GAS AND WATER COMPANY.

PURCHASE OF SURPLUS TAR.

**THE** Directors are prepared to consider OFFERS for the purchase of surplus TAR (about 1000 Tons), produced at their Gas-Works, Ash Road, Aldershot, S.W. Rly., and North Camp, Farnborough, S.E. Rly., for a Year from the 1st of January, 1901, to the 31st of December, 1901.
Specification and Conditions can be obtained on application per post.
Tenders to be sent in to the undersigned, endorsed "Purchase of Surplus Tar," to arrive not later than Wednesday, Nine a.m., the 21st of November, 1900.
The highest or any Tender not necessarily accepted.
By order,
R. W. EDWARDS,
Secretary.
Oct. 12, 1900.

FIRE-CLAY GOODS.

**THE** Directors of the Sheffield United Gaslight Company invite TENDERS for the supply of SILICA and FIRE-CLAY GOODS, required at their Neepsend, Effingham Street, and Grimesthorpe Stations during the next Twelve Months.
Specifications and Forms of Tender may be obtained on application to the Company's Engineer, Mr. J. W. Morrison.
The Directors do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, marked "Tender for Fire-Clay Goods," must be delivered by post to the undersigned not later than the first post on Saturday, Nov. 3.
HANBURY THOMAS,
General Manager and Secretary.
Commercial Street, Sheffield,
Oct. 15, 1900.

CORPORATION OF LEICESTER.

RETORTS AND FIRE-BRICKS.

**THE** Gas and Electric Lighting Committee of the above Corporation are prepared to receive TENDERS for the supply and delivery of RETORTS and FIRE-BRICKS.
Specifications, Quantities, and Form of Tender can be obtained from the Engineer.
Tenders, addressed to Alderman Lennard, J.P., Chairman, and endorsed "Tender for Retorts, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Tuesday, the 30th of October, 1900.
The Committee do not bind themselves to accept the lowest or any Tender.
ALFRED COLSON, M.Inst.C.E. & M.Inst.E.E.,
Engineer and Manager.
Offices: Millstone Lane,
Leicester, Oct. 12, 1900.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

**NOTICE** is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of the above Company will be held at the Offices of the Company, 30, Gracechurch Street, in the City of London, on Tuesday, the 6th day of November, 1900, at Three o'clock in the afternoon precisely, to receive the Directors' Report and the Accounts of the Company for the Half Year ended the 30th day of June last, and to transact the General Business of the Company.
The TRANSFER BOOKS WILL BE CLOSED from the 24th of October to the 6th of November, both inclusive.
By order of the Board,
SAMUEL WOOD,
Secretary.
Offices: 30, Gracechurch Street,
London, Oct. 22, 1900.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

SALE OF ORDINARY STOCK.

**THE** Directors have instructed Mr. ROBERT MACK to SELL BY AUCTION, at the Offices of the Company, Newcastle-upon-Tyne, on Wednesday, the 7th day of November, 1900, at Twelve o'clock at noon,
TWENTY-FIVE THOUSAND POUNDS
ORDINARY STOCK
of the Company, to be issued under the Powers of the Company's Act of 1896.
For Conditions of Sale and further Particulars, apply to the undersigned.
THOMAS WADDOM,
Secretary.
Offices: 35, Grainger Street West,
Newcastle-upon-Tyne.

**The List will open on Monday, the 22nd day of October, 1900, and close on or before the Wednesday following.**

# IRISH PROVINCIAL GAS COMPANY, LTD.

**(Incorporated under the Companies Acts, 1862 to 1898.)**

*Formed to acquire, by purchase or by the acquisition of Shares, the Gas-Works and Allied Undertakings at*

| | | |
|---|---|---|
| Carrick-on-Shannon | Mullingar | Roscrea |
| Castlebar | Mallow | Sligo |
| Ennis | Newbridge | Tuam |
| Longford | Naas | Westport |

In the case of the Sligo Gaslight and Coke Company, this Company has acquired, by Letters of Agreement from individual holders, sufficient shares in the Sligo Gaslight and Coke Company to give this Company the full control of the business of the said Sligo Gaslight and Coke Company.

| | |
|---|---|
| **SHARE CAPITAL - - - - - -** | **£110,000** |
| **4½ % FIRST MORTGAGE DEBENTURE STOCK** | **50,000** |
| | **£160,000** |

The Share Capital is divided into 110,000 Ordinary Shares of £1 each.

## PRESENT ISSUE.

| | |
|---|---|
| **£50,000 4½ per cent. First Mortgage Debenture Stock . . . .** | **£50,000** |
| **65,000 Ordinary Shares of £1 each . . . . . .** | **65,000** |
| | **£115,000** |

The Debenture Stock will be redeemable at £108 per £100, at the option of the Company, on or after the 1st January, 1915, on six months' previous notice; any partial redemption being by purchase or drawings.

The Debenture Stock will be registered in the Books of the Company, and the Interest will be payable half yearly on the 1st day of April and the 1st day of October in each Year.

The Debenture Stock and the Interest thereon will be secured by a First Mortgage to the Trustees for the Debenture Stockholders of the properties now to be acquired by the Company, and by a first floating charge (subject to a power reserved to charge further issues on hereditaments which may be subsequently acquired) on all the other assets (but not including unissued or uncalled capital) of the Company.

The Debenture Stock will be transferable in multiples of £5.

The under-mentioned Banks are authorized to receive subscriptions for the First Mortgage Debenture Stock, and Ordinary Shares, payable as follows:—

| DEBENTURE STOCK. | | ORDINARY SHARES. | |
|---|---|---|---|
| £10 | per cent. on application. | 1/- | per share on application. |
| £40 | „ „ „ allotment. | 6/6 | „ „ „ allotment. |
| £50 | „ „ two months after allotment. | 5/- | „ „ one month after allotment. |
| | | 7/6 | „ „ two months after allotment. |
| £100 | | £1 | |

**Trustees for the Debenture Stockholders.**

THE RIGHT HON. SIR THOMAS D. PILE, Bart., Lord Mayor of Dublin.
ALDERMAN W. F. COTTON, J.P., Managing-Director, Alliance and Dublin Consumers' Gas Company.

**Solicitor for the Trustees.**

D. O'C. MILEY, 16, Dame Street, Dublin.

**Directors.**

W. R. FENTON, Crown Solicitor, Sligo.
WILLIAM A. WALLIS, J.P., Fairy Hill, Blackrock, Co. Dublin.
J. W. RUSSELL WALL (Biggs, Wall, and Co., Gas and Water Engineers), 13, Cross Street, London, E.C.
CORNELIUS B. TULLY, Past-President Irish Association of Gas Managers; Engineer, Sligo Gas Company (MANAGING-DIRECTOR).

**Bankers.**

THE NATIONAL BANK, Limited, College Green, Dublin; the Head Office—13, Old Broad Street, London, E.C., and all Branches.
THE PROVINCIAL BANK OF IRELAND, Limited, College Street, Dublin; the Head Office—8, Throgmorton Avenue, London, E.C., and all Branches.
ULSTER BANK, Limited, College Green, Dublin; the Head Office—Belfast, and all Branches.

**Solicitors for the Company.**

CASEY AND CLAY, 21, St. Andrew Street, Dublin.

**Consulting Engineer.**

PERCY GRIFFITH, Assoc.M.Inst.C.E., M.Inst.M.E., F.G.S. (Successor to the late Mr. Jabez Church), 54, Parliament Street, Westminster, London, S.W.

**Auditors.**

SMYLIE, LYNAS, AND CO., Chartered Accountants, 13, Donegall Square North, Belfast.

**Registered Offices.**

D'OLIER CHAMBERS, D'OLIER STREET, DUBLIN.

**Secretary.**

W. MONDS GREENE.

***Prospectuses can be obtained at the Company's Offices or Bankers.***

**NOTE.—The Directors, their Friends, and certain of the Shareholders of the above-mentioned concerns have applied for £30,000 of the Capital of the Company.**

**TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.**

SALE BY TENDER OF £10,000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MINIMUM PRICE, £103 per Cent.

IN PURSUANCE OF THE TOTTENHAM AND EDMONTON GAS ACT, 1898.

**NOTICE is Hereby Given**, that it is the intention of the Directors of this Company to SELL BY TENDER £10,000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK of the Company, to be paid up in full on or before the 7th day of December next; such Stock being a portion of the Additional Capital authorized to be raised by Resolution passed at an Extraordinary General Meeting of Proprietors, held on the 24th day of February, 1900, in pursuance of the Powers under Sections 15 and 17 of the above-mentioned Act.

Particulars, Conditions, and Form of Tender may be had on application at this Office, and sealed Tenders must be sent in not later than Four o'clock in the afternoon of Monday, the 19th day of November next.

By order,
JAMES RANDALL,
Secretary.

Offices: Willoughby Lane,
Tottenham, Oct. 12, 1900.

**SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.**

**MR. ALFRED RICHARDS** begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
**ILFORD GAS COMPANY.**

£5000 ORDINARY STOCK.

**MR. ALFRED RICHARDS will Sell the** ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Nov. 6, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
**EPSOM AND EWELL GAS COMPANY.**

NEW ISSUE OF £3000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

**MR. ALFRED RICHARDS will Sell the** ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Nov. 6, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Executors of H. W. Ulph, Esq., deceased, and other Owners.

**GAS AND WATER STOCKS AND SHARES**
IN THE
BRITISH GASLIGHT COMPANY,
BRENTFORD GAS COMPANY,
BARNET DISTRICT GAS AND WATER COMPANY,
EAST COWES GAS COMPANY,
GORING AND STREATLEY GAS AND WATER COMPANY.

**MR. ALFRED RICHARDS will Sell the** ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Nov. 6, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
**WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.**

NEW ISSUE OF £30,000 NEW ORDINARY STOCK.

**MR. ALFRED RICHARDS will Sell by** AUCTION at the Mart, E.C., on Tuesday, Nov. 13, at Two o'clock, in Lots.

£30,000 of NEW ORDINARY STOCK

in the above Undertaking, ranking for a Standard Dividend of 3½ per cent., subject to the Sliding-Scale, and entitled under the present price charged for Gas to a Dividend of £5 1s. 6d. per cent.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

*Now Ready, Price 15s., Limp Cloth,*

— TWENTIETH YEAR —
AN
# ANALYSIS OF THE ACCOUNTS
OF THE
## METROPOLITAN WATER COMPANIES
AND OF THE
CORPORATION WATER UNDERTAKINGS
OF
**EDINBURGH, GLASGOW, & MANCHESTER,**
FOR THE YEAR 1899-1900.

**Compiled by**
**LASS, WOOD, & DREW,**
Chartered Accountants.

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C

*Now Ready. Price, Cloth Bound, 12s. 6d.; Morocco Gilt, 18s.*

**GAS COMPANIES'**
# BOOK-KEEPING.
**A Practical Treatise on the Keeping of Gas Companies' Accounts.**

BY
**JOHN HENRY BREARLEY & BENJAMIN TAYLOR,**
OF LONGWOOD.

**The only complete Treatise on Gas Companies' Book-Keeping ever published.**

This book will be found invaluable to those desirous of obtaining a thorough grasp of Gas Companies' Book-Keeping and Accountancy.

A complete set of Transactions are dealt with; the same being entered into the various Books, and posted into the Ledgers. A Model Balance-Sheet is prepared from the set of transactions and postings.

Forms and subsidiary books are illustrated and described. The linking together of the various books is shown at a glance by means of a Chart.

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

**NITRATE of Thorium and Cerium.**
FABRIK CHEMISCHER PRAEPARATE VON STHAMER, NOACK, AND CO., HAMBURG.

**THOMAS DUXBURY & CO.,**
**16, DEANSGATE, MANCHESTER.**

Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.

**Telegrams: "DARWINIAN, MANCHESTER."**
**Telephone 1806.**

# NEWBATTLE CANNEL.
**Highest Results in Gas, & Excellent Coke.**

**QUOTATIONS ON APPLICATION TO**
## THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
**DALKEITH, N.B.**

# JAMES OAKES & CO.
**ALFRETON IRON-WORKS, DERBYSHIRE,**
AND
**Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,**

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts and Covers, and rendering Leakage impossible.

# BOLDON GAS COALS.

| | | |
|---|---|---|
| Yield of Gas per Ton. . | 10,500 | Cubic Feet. |
| Illuminating Power . . | 16·9 | Candles. |
| Coke . . . . . | 66·7 | Coke. |
| Sulphur . . . . . | 0·86 | Sulphur. |
| Ash . . . . . | 2·04 | Ash. |

As per Analysis by
**Mr. JOHN PATTINSON, F.I.C., F.C.S.**

**For Prices, &c., apply to**
**W. H. PARKINSON,**
**THE HARTON COAL CO., LTD.,**
**NEWCASTLE-ON-TYNE.**

Telegraphic Address: "PARKINSON, NEWCASTLE."

**UNEQUALLED.**

Gas Companies are solicited to try Samples of the

# MIRFIELD
**BLACK BED GAS COAL.**

***Prices and Analysis on application.***

**MIRFIELD (GAS-COAL) COLLIERY COMPY.**
**RAVENSTHORPE, NEAR DEWSBURY.**

# HEATHCOTE GAS COAL.
**Rich in Illuminating Power and Yield of Gas.**
**Above the Average in Weight and Quality of Coke.**
**Maintains a High Standard in Residuals.**

## THE GRASSMOOR CO., LD.,
**CHESTERFIELD.**

# HARDMAN & HOLDEN, LD.
ESTABLISHED 1820.
# SULPHURIC ACID.
GUARANTEED absolutely free from Arsenic and of excellent Purity. Specially prepared for Sulphate of Ammonia Manufacturers.

Works: BLACKBURN; Miles Platting and Clayton, MANCHESTER.

Head Office: Miles Platting, MANCHESTER.

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**SHEAF WORKS, SHEFFIELD,**
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**FILES OF BEST QUALITY**
**FOR ENGINEERS.**
## STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

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**FOR**
## GAS PURIFICATION,
**For use in the**
**RECOVERY OF SULPHUR,**
ALSO
**Removal of last Traces of SULPHURETTED HYDROGEN in catch position.**

**Full Particulars on application to the Patentees:**
## GAS DESULPHURIZATION CO.,
*— LIMITED, —*
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## PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.

For Particulars Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

*Prices are Reduced.*

## THORNLEY GAS COALS

WORKED BY THE

**WEARDALE IRON & COAL Co., Ld.**

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

**Analysis made by**

**Messrs. J. & H. S. PATTINSON.**

| | |
|---|---|
| Yield of Gas per Ton | 10,500 Cub. Ft. |
| Illuminating Power | 16·9 Candles. |
| Coke (of good quality) | 67·5 per Cent. |
| Sulphur | 0·58 ,, |
| Ash | 2·73 ,, |

**For Price, &c., apply to the**

**WEARDALE IRON & COAL Co., Ld.**

**QUAYSIDE, NEWCASTLE-ON-TYNE.**

## HOLMSIDE

## GAS COALS.

**Present Daily Produce over 5000 Tons.**

*Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation*

| | |
|---|---|
| Yield of Gas per Ton | 11,205 Cubic Feet. |
| Illuminating Power | $16\frac{7}{10}$ Stand. Sperm Candl. |
| Coke (of good & pure quality) | $13\frac{3}{4}$ Cwt. per Ton. |
| Sulphur | A little over 1 per Cent. |
| Ash | Under 1 per Cent. |
| Tar | 163 lbs. (Avoir.) per Ton. |
| Ammoniacal Liquor | 103 lbs. (Avoir.) per Ton. |

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

## SOUTH MOOR

## PELTON GAS COALS.

**Present Daily Produce available 3000 Tons.**

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

These Coals may be bought through the Principal Merchants in England, or direct from

**MR. MARK ARCHER,**

**HOLMSIDE & SOUTH MOOR OFFICES,**

**NEWCASTLE-UPON-TYNE.**

GAS-FITTINGS.

## BURNERS

Welsbach Pattern

per **7/6** Doz.

*WRITE FOR CATALOGUE.*

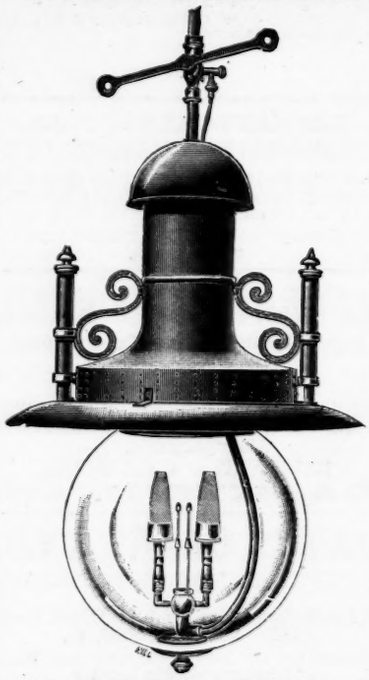
**WHOLESALE FITTINGS COMPANY**

80, Commercial Road, London, E.

INCANDESCENT

THE PATENT

## "BEACON" GLOBE LAMP.



As fitted at London Bridge near Railway Approach, three Lamps giving the Illuminating Power of 600 Candles. See Surveyor's Report as published in the "*JOURNAL*" for Jan. 10, 1899.

**H. GREENE & SONS, Ld.,**

Late of Cannon Street,

**19, Farringdon Road, E.C.**

Telegrams: "LUMINOSITY, LONDON."

## LONDONDERRY GAS COALS

FROM THE

## LONDONDERRY COLLIERIES,

**COUNTY OF DURHAM.**

Available Output up to 5000 Tons per day.
Yield of Gas 11,000 cubic feet per Ton of Coal as per Analysis by
Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

**S. J. DITCHFIELD,**

**SEAHAM HARBOUR,**

**COUNTY OF DURHAM.**

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

## CANNEL & COAL.

## TYNE BOGHEAD CANNEL.

| | |
|---|---|
| Yield of Gas per ton | 13,155 cub. ft. |
| Illuminating Power | 38·22 candles. |
| Coke per ton | 1,301·88 lbs. |

## EAST PONTOP GAS COAL.

| | |
|---|---|
| Yield of Gas per ton | 10,500 cub. ft. |
| Illuminating Power | 17·8 candles. |
| Coke | 70 per cent. |

## SOUTH PELAW MAIN GAS COAL.

| | |
|---|---|
| Yield of Gas per ton | 10,500 cub. ft. |
| Illuminating Power | 16·3 candles. |
| Coke | 73·1 per cent. |

*For Prices and complete Analysis, apply to*

**THOS. W. DANCE, SON, & HUNTER**

COAL OWNERS, NEWCASTLE-ON-TYNE;

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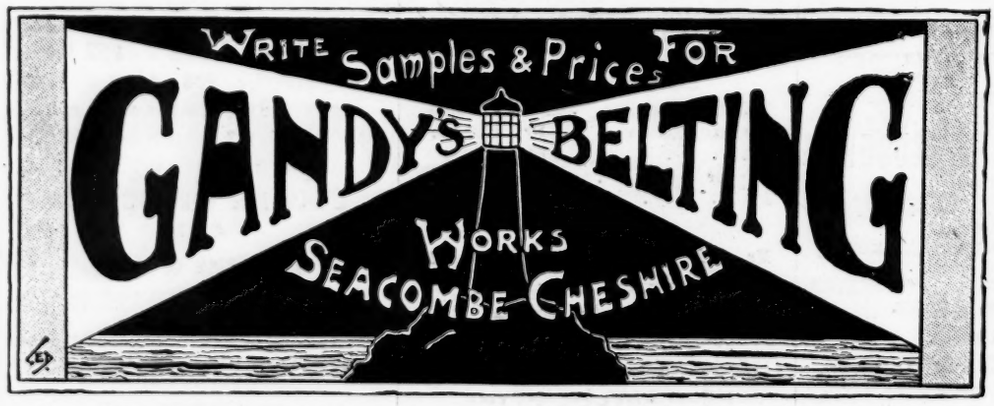


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AS USED BY THE LEADING GAS AND WATER COMPANIES.

# NAPHTHALENE

**(Young & Glover's Patent, No. 20,125 of 1896.)**

This Patent entirely covers the Use of Heavy Oils in the **TREATMENT OF NAPHTHALENE,** or in the Extraction of Same from Coal Gas.

By arrangement with the Proprietors of the above Patent, we are now prepared to receive enquiries and consult with Managers of Gas-Works where trouble is experienced with **NAPHTHALENE DEPOSITS,** and to instal the necessary Apparatus.

## JAMES MILNE & SON, LTD.,

**GAS ENGINEERS,**

**Milton House Works, EDINBURGH.**

Telephone No. 103. Telegraphic Address: "ELEVATOR, HASLINGDEN."

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**COAL AND COKE ELEVATORS & CONVEYORS.**

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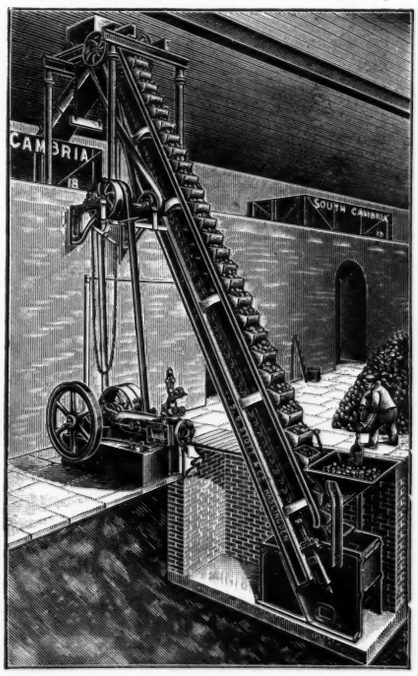
**WHARF ELEVATORS FOR UNLOADING BARGES.**

**ELEVATORS & CONVEYORS for BOILER-HOUSES.**

**STAMPED AND RIVETED STEEL ELEVATOR BUCKETS.**

**DETACHABLE CHAINS AND SPROCKET WHEELS.**




Coke Elevator Loading Railway Waggons.

**LIME AND OXIDE ELEVATORS & CONVEYORS.**

**HIGH-CLASS STEAM-ENGINES up to 1000-Horse Power.**

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**BEAM PUMPING-ENGINES.**

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## CYLINDRICAL LANTERN.

EFFICIENT. ELEGANT. ECONOMICAL.

*SHADOWLESS AND GENERATIVE.*
*COMPLETELY WINDPROOF.*

*BREAKAGE OF GLASS*
*REDUCED TO A MINIMUM.*

Hinged top for convenience of Cleaning, &c., with door at bottom for lighting.

Perfect Diffusion.

Glass Cylinders Renewed at Small Cost.

WIDELY USED WITH BRILLIANT SUCCESS ON THE CONTINENT.

STRENGTH AND ELEGANCE COMBINED.

Galvanized Iron Top.
Glass Cylinder.
Cast-Iron Upper and Lower Rims.

A Perfect Lantern for thoroughly Economical and Efficient Incandescent Gas Lighting.

VERY MODERATE PRICE HIGHEST POSSIBLE LIGHTING EFFECT.

STRONGLY RECOMMENDED.

Special Prices for Lanterns for 1, 2, and 3 Light Clusters and upwards on application to

## The Welsbach Incandescent Gas-Light Co., LIMITED

*Public Lighting Department, York Street, Westminster, London, S.W.*

1st. Take out Seal Screw and remove Handle.

# PREPAYMENT METERS

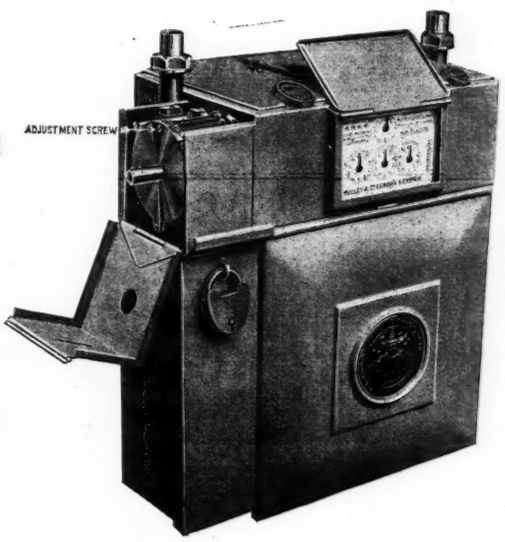
## Price Changing *in Situ.*

**OUR PRICE-CHANGING SYSTEM** as Illustrated is the simplest, quickest, and most accurate yet devised. **NO NEW WHEELS OR PARTS** are required; and the arrangement is entirely covered over and sealed.

**ALL PARTS INTERCHANGEABLE.**

**GUARANTEED FOR FIVE YEARS.**

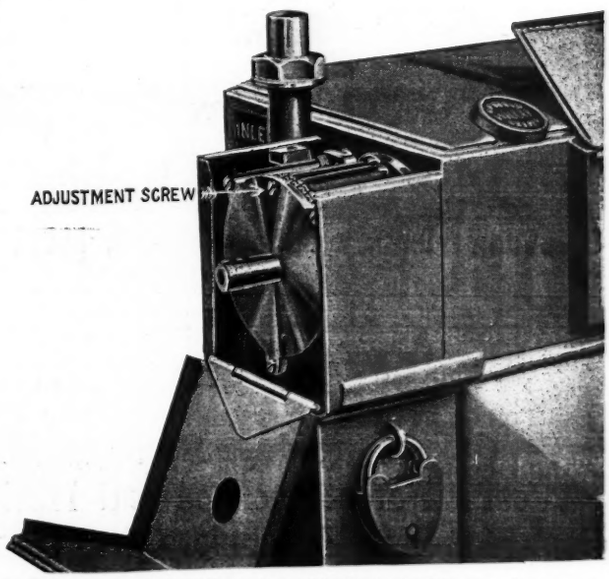
**Cannot be tampered with through the Slot.**
**Slot closed when maximum number of coins are inserted.**




**Tens of Thousands in use and adopted exclusively by many Gas Companies.**

2nd. Swing over Cover and remove Adjustment Screw.

Exclusive Contracts in operation for **FITTING UP HOUSES** including **THE MAINTENANCE** of the **FITTINGS** and **METERS** in Plymouth, Swansea, Devonport, and Newport.




3rd. Turn loose Ring until number of feet required is opposite arrow, replace Adjustment Screw and Re-seal.

# Willey & Co.,

**LONDON EXETER.**

# WEST'S GAS IMPROVEMENT CO., LTD.,

ALBION IRON-WORKS, MILES PLATTING,

And 104, QUEEN VICTORIA STREET, LONDON, E.C. **MANCHESTER.**

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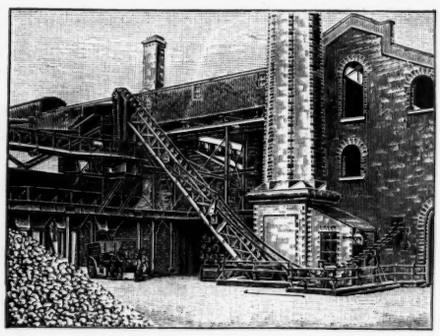
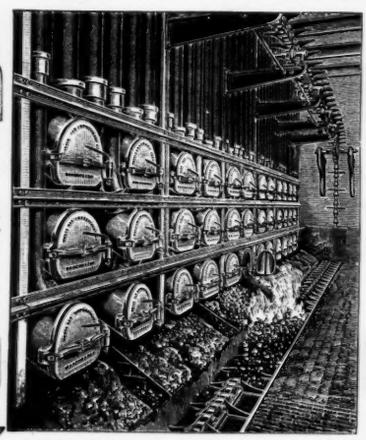
## WEST'S STOKING MACHINERY FOR CHARGING AND DRAWING GAS-RETORTS.

ALSO

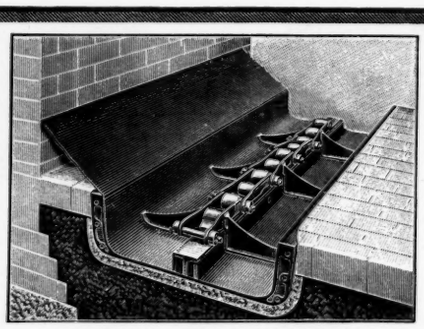
## WEST'S PATENT SILENT COKE CONVEYOR



VIEW SHEWING END OF COKE CONVEYOR, ELEVATOR AND CONVEYOR FOR STORING COKE IN HOPPERS AND COKE YARD.



INTERIOR OF RETORT HOUSE SHEWING COKE CONVEYOR.



SECTION OF COKE CONVEYOR.

**Silent in Action. Simple Wearing Parts. Does not make Breeze.**

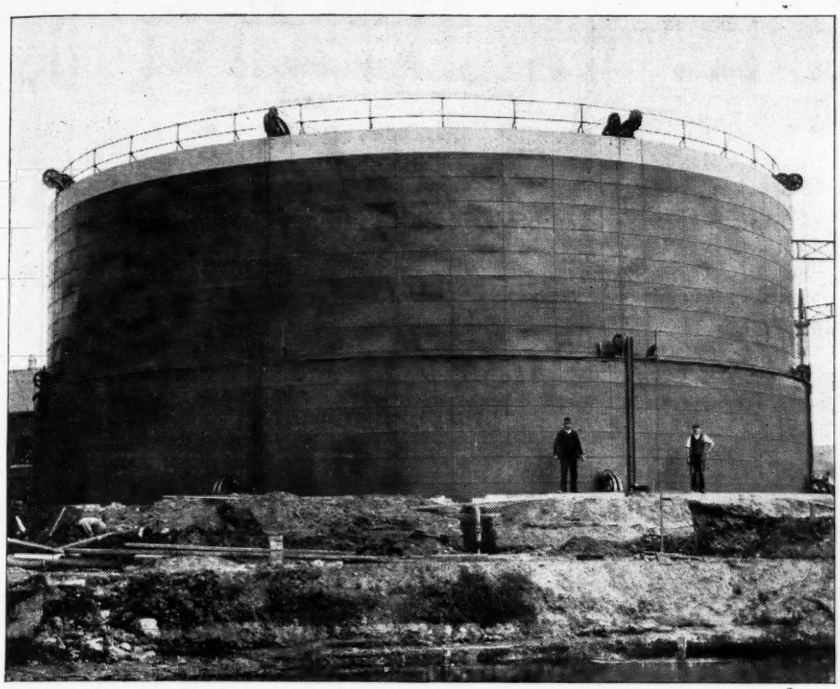
**SPECIALLY ADAPTED FOR CONVEYING, ELEVATING, AND STACKING HOT COKE FROM GAS-RETORTS OR COKE-OVENS.**

The Conveyor after leaving the Retort-House may be arranged to rise up an incline to any required height, and the Coke delivered from the Conveyor to the Coke-Store from any part of the Conveyor.

*ALSO MAKERS OF*

**West's Coke Breaking, Sorting, Sizing, and Screening Machinery.**
**West's Patent Inclined and Horizontal Regenerator Settings.**
**Coal-Handling Machinery for Gas and Electric Light Works.**

***GAS AND GENERAL ENGINEERS.***



Two-Lift Cable-Guided Gasholder, 80 ft. diameter by 20 ft. deep.
STAFFORD CORPORATION GAS-WORKS. (*From a Photo.*)

**COPY OF TESTIMONIAL.**

CORPORATION OF STAFFORD,
GAS & ELECTRICITY DEPARTMENT,
STAFFORD, *Feb.* 9, 1899.

Messrs.
ASHMORE, BENSON, PEASE, & CO., LTD.,
Stockton-on-Tees.

GENTLEMEN,

It affords me pleasure to state that our No. 2 Gasholder, from which you removed the outside Guide-Framing on account of it being defective due to the settlement of the foundations, and substituted your Steel-Wire Cable System for both Inner and Outer Lifts, has, since the alteration, **worked perfectly satisfactory.**

Its Stability and Rigidity under High Wind Pressures, when fully inflated, is such that **it preserves the level working of both Lifts, and gives a steady outlet pressure.**

I am, sincerely yours,
JNO. FERGUSON BELL,
Engineer.

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## STOCKTON-ON-TEES.

ESTABLISHED 1844. **ORIGINAL MAKERS.** ESTABLISHED 1844.

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*The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.*

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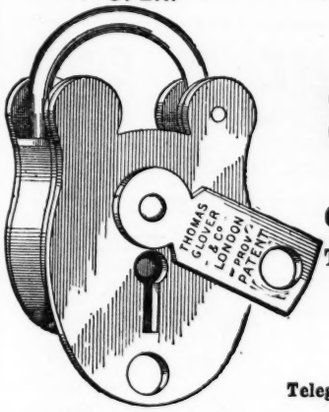


THOMAS GLOVER & CO.'S

**PATENT**

# SECURE PADLOCK

PREVENTS TAMPERING WITH THE

**CASH-BOXES OF PREPAYMENT METERS.**

**The Padlock is Sealed by means of a Lead Eyelet, which is impressed with Company's private mark. Eyelets easily fixed and removed by Company's Collector.**

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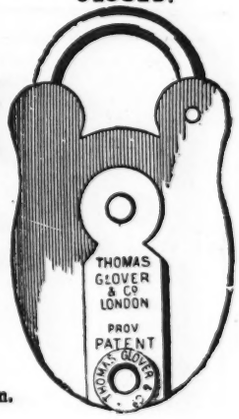


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**STEEL SCOOPS**

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Scoops supplied with or without handles, and of any dimensions or shape required.

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**ARROL-FOULIS**

**Patent Automatic Machinery**

FOR

**DRAWING AND CHARGING GAS-RETORTS.**

**Full Particulars may be obtained from the Sole Makers,**

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**GLASGOW.**

[See Illustrated Advertisement, Oct. 2, p. 867.]

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**GAS COAL AND CANNEL FACTORS,**

**Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.**

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SOCKET-PIPES FOR GAS OR WATER PURPOSES.

FLANGE PIPES FOR STEAM.

Sole Manufacturers of **LYON'S "PATENT" GAS-MAIN SYPHONS**

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*ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.*

**GRAHAM, MORTON, & CO., LTD.**
**INCLINED**
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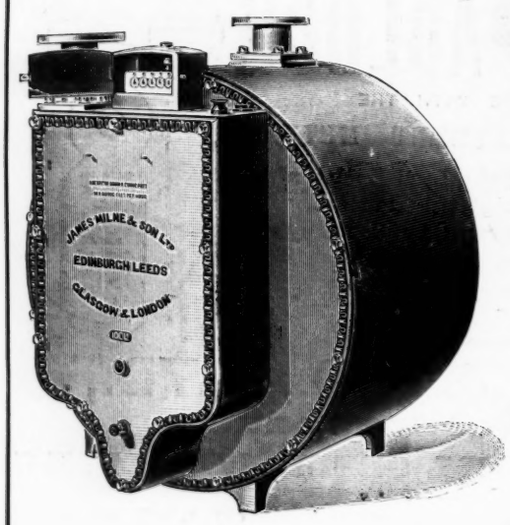


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**LARGE WET METERS**

IN CAST-IRON CASES.

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WITH OR WITHOUT FLOAT.

SUPPLIED WITH INLET AND OUTLET CONNECTIONS AT BACK IF PREFERRED.

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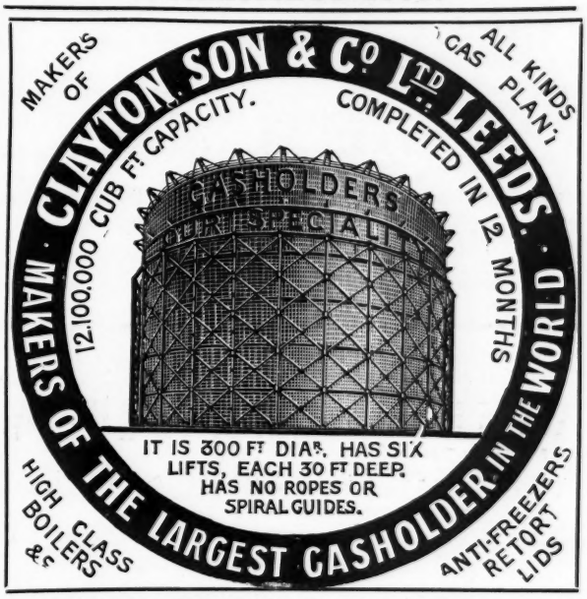
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IT IS 300 FT DIAM. HAS SIX LIFTS, EACH 30 FT DEEP. HAS NO ROPES OR SPIRAL GUIDES.
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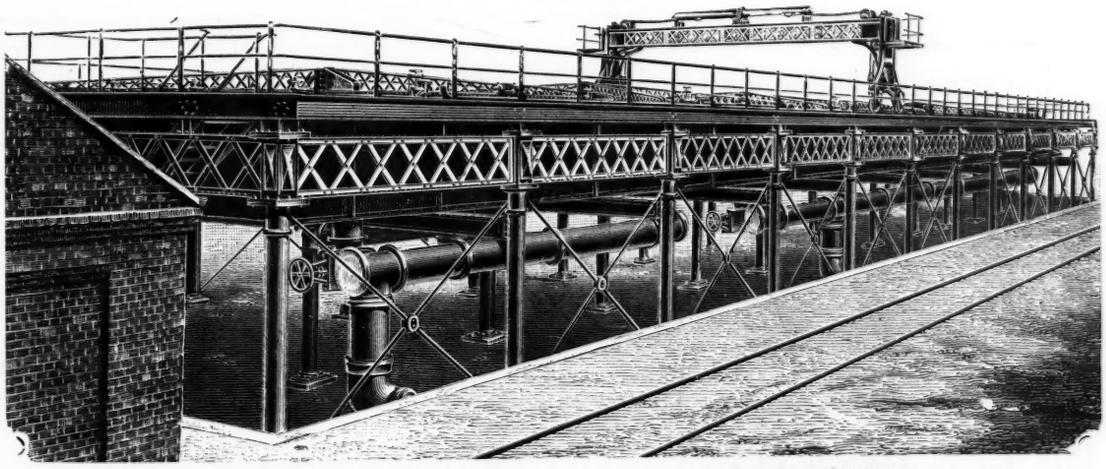

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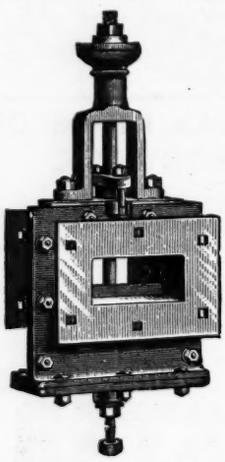

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